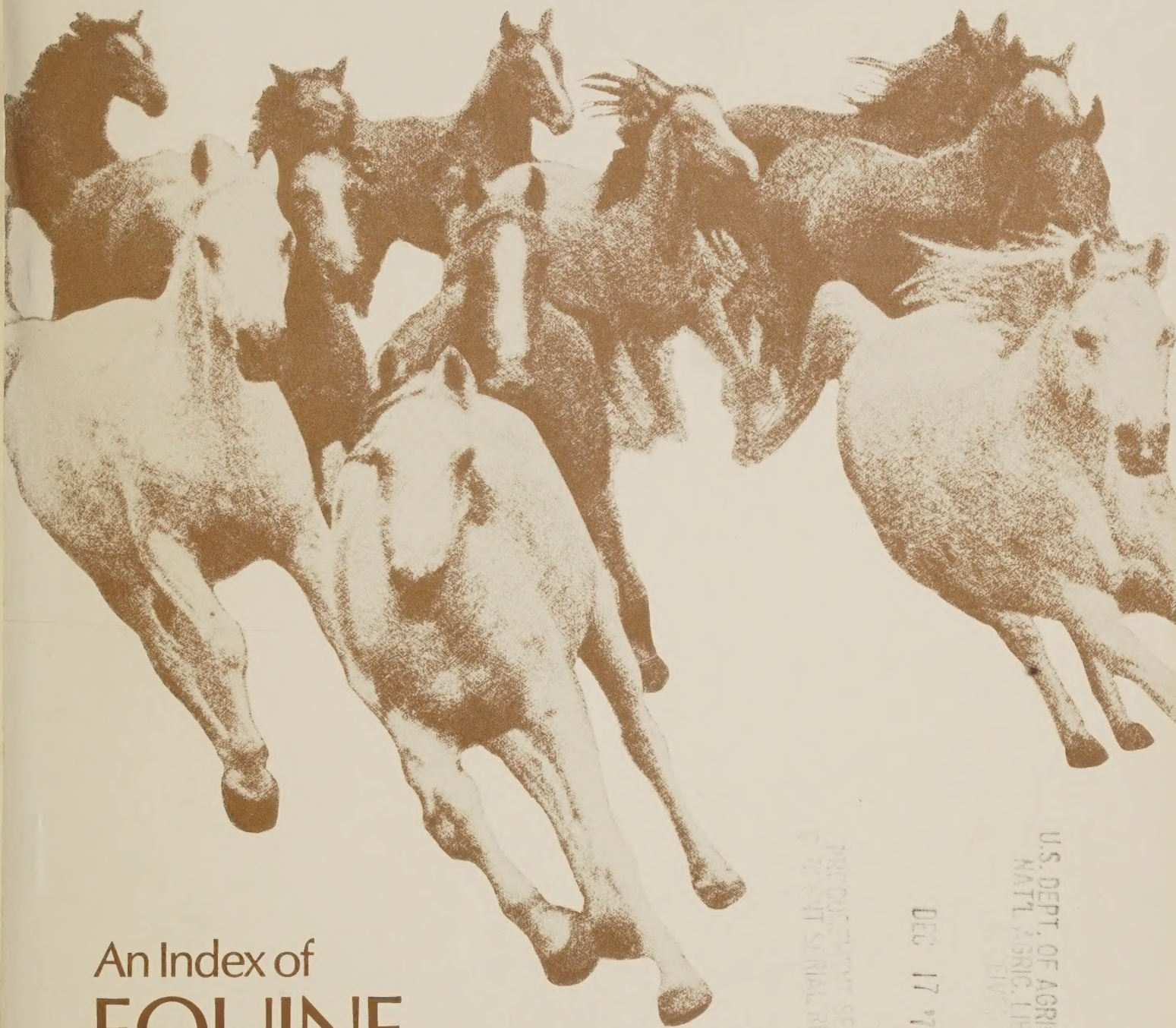


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An Index of
**EQUINE
RESEARCH**
1975

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An Index of Equine Research 1975

by

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Cooperative State Research Service

UNITED STATES DEPARTMENT OF AGRICULTURE

December 1975

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Description of Research Projects	3
Subject of Research Project	77
Investigators	82
Performing Organizations	84
Granting Agencies	93
Purposes of Selected Granting Agencies	97
Keyword in Context (KWIC Index)	100

INTRODUCTION

Index of Equine Research 1975 was prepared for the benefit of the equine industry in its growing role as an economic and recreational resource of the United States. Its purposes are to facilitate communication among scientists who are performing research on problems of horses, ponies, mules and other equines, and to inform administrators and other interested citizens of the scope and intensity of the research.

Earlier indexes of equine research were published by the United States Department of Agriculture, 1972 and by the Morris Animal Foundation of Denver, Colorado, 1965 and 1966. The Index of Equine Research 1975 represents a unique effort. Its relative completeness was significantly aided by the availability of automated information retrieval from the Current Research Information System (CRIS) of the U.S. Department of Agriculture, the Smithsonian Science Information Exchange (SSIE) of the Smithsonian Institution, the Division of Research Grants of the National Institutes of Health (NIH), and by the generous cooperation of many administrators in State universities, land-grant colleges, foundations, and horse-breed registries. The contributions of these agencies and individuals to the preparation of Index 1975 are acknowledged with appreciation.

How to Use the Index of Equine Research 1975

The Index is a series of brief descriptions of individual research projects and a set of cross-indices. Each project is identified by an accession number. Project descriptions are arranged under the State in which the research is being performed. In the cross-indices, the accession numbers of the projects are grouped in the following categories:

Subject of Research Project
Investigator
Performing Organization
Granting Agency

In addition, there is an index of titles arranged alphabetically by keyword-in-context (KWIC Index). Titles of some projects have been augmented to include keywords from the project descriptions. Items of interest may be located in the appropriate cross-index. To find the description of the research project to which a selected item applies, first note the 3-digit accession number next to the item designation. Then refer to the section of the Index of Equine Research entitled "Description of Research Projects." The project descriptions are arranged in numerical order by accession number.

Subject of Research Project index designates the subject-matter categories and specific subjects included in the research projects. Accession numbers of applicable project descriptions are shown next to the listed subject. Close examination of totals shown in "Subject of Research Project" will reveal more projects designated than are included in the section entitled "Description of

Research Project." This is due to the inclusion of work on more than one subject in some of the research projects.

Investigator index gives the name of the first research scientist given in the project document received from those who provided descriptive information.

Performing Organization is the administrative unit which receives and is responsible for the use of the funds provided by a granting agency.

Granting Agency is the administrative unit with authority to release research funds either to a performing organization or to scientists directly. A foundation acting as a granting agency may have received funds from many private donors. The agricultural experiment station of the respective State is a granting agency whose funds come from the State, U.S. Department of Agriculture, other Federal sources, and from private sources.

Research Funds and Manpower

Some quantitative estimates of research effort are presented in the cross-index entitled Subject of Research Project. Funds shown are the totals of all the projects combined under a given Subject category. The individual project total is not shown. Also, the indicated full-time equivalent scientists years (SY) engaged in research on a given subject was cumulated from the manpower estimate received with project descriptions. In those instances in which only a fund total was received, SY was calculated by dividing by a factor of \$108,000 if the project was supported either by a private source or by the Agricultural Research Service (ARS) of the U.S. Department of Agriculture. However, if the project was supported by the State agricultural experiment station SY was calculated by dividing by a factor of \$95,490. The factors were derived from CRIS summaries of June 1975 and from estimates provided by the Agricultural Research Service.

Totals of funds and scientist years for Subject index categories are mutually exclusive. Some projects had no record of funds or manpower. For this reason, the actual amounts being expended for equine research are probably greater than those shown.

Future Editions of the Index of Equine Research are anticipated, depending on user interest and the availability of funds. To assure that your project is included in a future edition, send descriptive information in the form shown to: Dr. Edwin I. Pilchard, Cooperative State Research Service, USDA, Washington, D. C. 20250. Your suggestions and comments for improvement of the Index are welcome.

DESCRIPTION OF RESEARCH PROJECT

Alabama

Comparison of Penis Pressures and Myography in Intromission

001

Investigator:	S. D. Beckett	Location:	School of Veterinary Medicine
Start:	June 1971		Animal Health Research
Terminate:	Indefinite		Alabama Agricultural Experiment Station Auburn University Auburn, Alabama 36830

Objectives:

Develop methods for determining corpus cavernosum pressures. Determine role of blood and certain muscles in penile tumescence. Determine mechanism involved in the prevention of corpus cavernosum pressure transmission into the arterial circulatory system.

Approach:

Telemetry systems will be utilized to record corpus cavernosum and arterial pressures during natural state tumescence and quiescence. Role of ischio-cavernosus and bulbo-cavernosus muscles will be determined by monitoring the bioelectrical potentials. Results of anatomical studies will be correlated with physiological data to clarify functional mechanisms.

Efficacy of a Trichlorfon Paste Oral Formulation Against *Gastrophilus* spp. in Ponies

002

Investigator:	T. R. Bello	Location:	School of Veterinary Medicine
Start:	May 1975		Animal Health Research
Terminate:	1976		Alabama Agricultural Experiment Station Auburn University Auburn, Alabama 36830

Objectives and Approach:

Evaluate antiparasitic efficacy against *Gastrophilus* larvae by a single treatment with a trichlorfon paste formulation given orally at various dosage levels in naturally infected ponies. Efficacy will be based on determination of larvae removed by treatment, those remaining in treated animals; compared with larvae naturally removed in nontreated ponies and those remaining in nontreated animals.

Investigator: R. C. Purohot
Start: 1972
Terminate: Continuing

Location: School of Veterinary Medicine
Animal Health Research
Alabama Agricultural
Experiment Station
Auburn University
Auburn, Alabama 36830

Objectives and Approach:

To produce hypertensive horses and compare them with naturally occurring hypertensive bleeders, determine the effects of angiotensin and renin inhibiting factors in naturally occurring and experimentally induced hypertensive horses. Telemetry system being used to determine blood pressure and electrocardiogram during exercise in normal, bleeders, nonbleeders and hypertensive horses. Plasma angiotensin, renin, aldosterone, sodium, potassium, calcium and other blood constituents being monitored to determine possible role of a specific factor on interaction of factors in etiology of the problem.

Arkansas

Parasitism in Domestic Animals

004

Investigator: J. F. Brown
Start: August 1962
Terminate: June 1975

Location: University of Arkansas
Fayetteville, Arkansas 72701

Objectives:

Conduct a continuing evaluation on the epizootiology of parasitic disease of domestic animals in Arkansas. Conduct a continuing evaluation of antiparasitic compounds as to efficacy, application, and methodology of administration. Consider the economic aspects of various programs of parasite control. Investigate methods of preventing and eliminating antiparasitic and other drug residues from domestic animals.

Approach:

Routine fecal specimen evaluation and autopsies for parasite burden will be conducted on various groups of research animals in cooperation with other project leaders. Administration and evaluation of approved and experimental drug compounds for activity against animal parasites in university-owned research livestock. Measure economic parameters of various parasite control procedures. Evaluate the systemic effects of various antiparasitic drug compounds on domestic animals and develop techniques to control and remove drug residues.

Arizona

Feral Burros and Forage Production in the Havasu Resource Area, California and Arizona

005

Investigator: W. W. Brady
Start: July 1974
Terminate: June 1975

Location: School of Engineering
Arizona State University
Tempe, Arizona 85281

Objective:

Provide information necessary for estimating carrying capacities of desert ranges for feral burros.

Approach:

Information about the desert habitat is being collected: (a) expected patterns of forage production and the relationship of these patterns to driving environmental variables, (b) effects of browsing on both forage species and total desert communities, and (c) variation in nutritive quality of forage species within and between years.

California

Respiratory Disease in Relation to Immune Competence

006

Investigator: A. A. Ardans
Start: 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of California
Davis, California 95616

Objectives:

Establish the normal competence and components of the immune system in foals and determine the prevalence of such congenital effects in the various breeds and their possible correlation with pneumonia.

Approach:

Study the normal immune system of foals, including the Arabian breed. Characterize defects in the immune systems of various breeds of horses. Determine the occurrence of pneumonias and possible correlation with immunologic deficiencies.

Investigator: G. P. Carlson
Start: 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of California
Davis, California 95616

Objectives:

Determine the relationship between changes in serum electrolytes of race horses undergoing exercise and muscle soreness.

Approach:

Investigate serum electrolyte changes in race horses undergoing exercise at various stages of training. Determine to what extent the changes are related to muscle soreness. Evaluate electrolyte changes as being related to or causing "Thumps" seen in exhausted horses during endurance trials.

Effects of Light on Equine Metabolism

008

Investigator: J. W. Evans
Start: November 1974
Terminate: November 1979

Location: Department of Animal Science
University of California
Davis, California 95616

Objectives:

Analyze endocrine and physiologic parameters which will describe the temporal relations of equine pituitary and ovarian hormones during the estrous cycle. Establish the influence of ultradian rhythms. Investigate the phase relationships of the reproductive hormones to other hormones (steroid) which play a role in reproduction.

Approach:

Mares with normal estrus cycles will be adapted to a 12:12 light-dark schedule and to constant temperature. They will then be trained to stand in a sampling cage for 5 day periods. Blood samples will be analyzed for luteinizing hormone, estrogen, progesterone, glucose, insulin and cortisol. The data will be subjected to statistical analysis.

Enzyme Structure/Function: Mechanism at Levels of Subunit Function and the Chemical Transformation

009

Investigator: M. F. Dunn
Start: January 1971
Terminate: December 1975

Location: Department of Biochemistry
University of California
Riverside, California 92507

Objectives:

The specific aim is to investigate the presumed structure-function interrelationship between the subunit of multi-site enzymes and the chemical transformation of reactants to products at the active sites. The study will include enzymes from various animal (horse and mouse) and plant sources.

Enzyme Structure/Function: Mechanism at Levels of Subunit Function
and the Chemical Transformation (continued)

009

Approach:

The research will place special emphasis on the following physico-chemical methods: Rapid kinetic studies using spectrophotometric and fluorometric analytical techniques in combination with the rapid-mixing stopped-flow apparatus-equilibrium binding studies concerning the chemical nature and the stoichiometry of various enzyme-coenzyme-inhibitor complexes via spectrophotometric fluorometric and potentiometric titration methods.

Pulmonary Mechanics and Mechanical Control of Breathing in
Newborn Foals

010

Investigator:	J. R. Gillespie	Location:	School of Veterinary Medicine
Start:	1975		University of California
Terminate:	Indefinite		Davis, California 95616

Objectives:

Characterize the mechanical control of breathing in newborn foals and determine its influence upon initiation and maintenance of breathing following birth.

Detection of Hepatitis in Blood

011

Investigator:	V. W. Girish	Location:	University of California
Start:	1974		San Francisco, California
Terminate:	1975		94102

Objective: Not provided

Equine Serum Hepatitis

012

Investigator:	D. G. Gribble	Location:	School of Veterinary Medicine
Start:	1975		University of California
Terminate:	Indefinite		Davis, California 95616

Objective:

Study the morphology, pathology, etiology, and pathogenesis of equine serum hepatitis.

Pathophysiological Bases of Muscle Diseases (Birds, Mammals)

013

Investigator:	T. A. Holliday	Location:	School of Medicine
Start:	1974		University of California
Terminate:	1975		Davis, California 95616

Objective: Not provided

Genetic Studies of Combined Immunodeficiency Disease (CID) in Horses

014

Investigator: A. Smith
Start: 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of California
Davis, California 95616

Objective:

Identify genetic markers for use in predicting and evaluating acceptance or rejection of tissue transplants.

Approach:

Perform blood typing and karyotyping on cases of combined immunodeficiency in order to identify genetic markers to use in monitoring success of tissue transplants. Determine the role in CID of the enzyme adenosine deaminase (ADA).

Lethal White Foals in Overo Horses

015

Investigator: A. Smith
Start: 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of California
Davis, California 95616

Objectives:

Characterize the inheritance of lethal abnormalities such as atretic colon and frequency of occurrence within the Paint and Pinto breeds. Provide new knowledge for breeders to use in coping with the problem.

Approach:

Study all-white foals of Paint and Pinto breeds and cross-bred foals of these breeds. (Specific approaches were not provided.)

Equine Reproduction

016

Investigator: G. H. Stabenfeldt
Start: September 1974
Terminate: September 1979

Location: School of Veterinary Medicine
University of California
Davis, California 95616

Objectives:

Determine reproductive hormones in plasma from mares collected during the different seasons, i.e., the normal breeding season, the anestrus period, and beginning of the breeding season.

Approach:

Several interrelated studies will be done relating to the hormonal control of normal ovarian function in the mare, on ways in which it is adversely affected by uterine disease, and methods of correcting abnormal ovarian function so as to restore fertility.

Investigator: E. P. Steffey
Start: 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of California
Davis, California 95616

Objectives:

Provide the necessary basic information, particularly with regard to quantitative assessment of our index of anaesthetic depth related to effective halothane concentration in the lungs. Develop a protocol for the evaluation of inhalation anaesthetics in horses.

Approach:

Systematically study and evaluate the potency and potential toxic hazards of volatile and gaseous anaesthetic agents in horses.

Colorado

Venezuelan Equine Encephalomyelitis in Horses, Laboratory Animals
and Insect Vectors

018

Investigator: J. G. Bowne
Start: April 1972
Terminate: February 1975

Location: Animal Disease Research Lab.
Denver Federal Center
Denver, Colorado 80225

Objectives:

Determine the pathology and cycle of infection caused by VEE in tissue culture, insect vectors, and target organs of infected horses. Determine route of infection, virus concentration in infected blood and efficiency of transmission of virulent and attenuated VEE virus by insect vectors.

Approach:

Infect various host systems with virulent and attenuated VEE virus and study the results via fluorescent antibody, histopathology, electron microscopy and selected virus assay systems. Determine threshold of infection of selected insect vectors. The viral concentrations and relationships with the formed elements of the blood and hematopoietic tissues of the horse will be determined. Determine the effect of virulence of serial passage of VEE from insects-horse-insect sequences.

Physicochemical Characterization of Genome and Virion of Togaviruses

019

Investigator: N. M. Foster
Start: April 1975
Terminate: April 1979

Location: Animal Disease Research Lab.
Denver Federal Center
Denver, Colorado 80225

Objective:

Study the physicochemical nature and biologic activity of togavirus virions and develop methodology to produce an inactivated VEE vaccine.

Pathogenesis and Immunogenesis of Equine Encephalitis Viruses

020

Investigators: M. M. Jochim
Start: April 1975
Terminate: April 1978

Location: Animal Disease Research Lab.
Denver Federal Center
Denver, Colorado 80225

Objective:

Evaluate the clinical and immunologic responses of host animals to EEE, WEE, and VEE viruses, relationships among the viruses, differential neutralizing antibody responses and other aspects of pathogenesis and immunity.

Approach:

Horses will be infected with virulent EEE and WEE viruses and clinical, serologic and virologic responses studied. After recovery from illness, immunity will be challenged by inoculation with equine virulent VEE virus. Antibody studies will include plaque neutralization, complement-fixation and hemagglutination-inhibition. Bone marrow and lymph node biopsies of horses and/or laboratory animals will be studied by electron microscopy, immuno-fluorescence and radiolabeling to determine VEE virus interaction with lymphoid and hematopoietic centers.

Transmission of Virus Diseases by Gnats and Mosquitoes

021

Investigator: R. H. Jones
Start: March 1966
Terminate: September 1975

Location: Animal Disease Research Lab.
Denver Federal Center
Denver, Colorado 80225

Objective:

Determine the vectors, delineate their roles, establish rearing techniques, investigate the vector-virus physiological relationships and evaluate control measures for insects that transmit virus diseases, especially those diseases of sheep, cattle, and horses, such as blue-tongue and encephalitis.

Approach:

Colonize and rear disease-free blood feeding gnats and mosquitoes for use in virus transmission studies with veterinarians. Conduct epidemiological studies in the field and develop methods for control of insect vectors. Conduct physiological and pathological studies of the vector insects.

Equine Fetal Immunoglobulins from in Utero VEE Vaccine Virus

022

Investigator: D. Morgan
Start: October 1974
Terminate: October 1976

Location: Animal Disease Research Lab.
Denver Federal Center
Denver, Colorado 80225

Objective:

Characterize the fetal immunoglobulins formed after in utero inoculation and determine the sequence of appearance and efficiency of neutralization.

Approach:

Equine fetuses will be inoculated with VEE vaccine virus at 8 months gestation and removed by surgery 3 to 7 weeks later. The type of immunoglobulins will be

determined and then used in neutralization tests for VEE antibody. The sequence of appearance of the various immunoglobulins produced by the equine fetus and inoculated adult horses will be studied.

Virulence of Venezuelan Equine Encephalitis Virus by Host Passage

023

Investigator:	T. E. Walton	Location:	Animal Disease Research Lab.
Start:	April 1975		Denver Federal Center
Terminate:	April 1979		Denver, Colorado 80225

Objective:

Colonize blood-sucking insects for VEE transmission studies, determine viral infection thresholds and attempt vaccine viral reversion to virulence and sylvatic virus enhancement of virulence in horses and vectors.

Approach:

Populations of potential vectors of VEE will be colonized and assayed for susceptibility of VEE subtypes, variants and vaccine virus. Selected susceptible populations will be used to serial-cyclicly transmit vaccine virus from mosquitoes to mice and horses to determine if virulence is enhanced for equines. Vaccine virus will be alternately passaged in fetal horse cell cultures and an insect cell line to enhance viral virulence. A change in viral virulence after animal and cell passage will be measured by guinea pig and horse tests and changes in plaque morphology and HA pH optima. Sylvatic VEE subtypes will be passaged and assayed to enhance virulence in expectation that the origin of epizootic VEE variants will be defined. The effects of equine-virulent VEE transmission by natural vectors on clinical course, viral lethality and serological responses of horses will be contracted with effects of artificial infection.

Delaware

Biology of Bot Flies

024

Investigator:	E. P. Catts	Location:	University of Delaware
Start:	July 1974		Agricultural Experiment
Terminate:	June 1975		Station
			Newark, Delaware 19711

Objective:

Study aspects of the biology of bot flies.

Approach:

Appropriate equipment will be used to record meteorological events for correlation with biological activity. Bot flies will be colonized for rate of development and host immunity studies. Progressive studies on the histopathological description of warble cyst development. Mating history and physiological age determined by dissection and examination of fat body reserve or parity. Location of aggregation sites and movements followed during mating and ovaposition by observation, motion pictures and marked-release methods.

Investigator: H. B. Kingsbury Location: University of Delaware
Start: 1974 School of Engineering
Terminate: Indefinite Newark, Delaware 19711

Objective:

Characterize the bio-mechanical origins of lameness, as experienced by racehorses.

Approach:

The program of study will consist of the following: (1) Data acquisition and analysis. (2) Refinement of an existing bio-mechanical model. (3) Determination of bone and joint forces. (4) Parametric studies of factors affecting bone, joint, and muscle forces. Data will be obtained using an existing measurement technique consisting of a triangular force plate buried beneath a track, together with a simultaneous cinematographic recording.

District of Columbia

Influences of Horses on Materials Cultures of the Southwest

026

Investigator: R. E. Ahlborn Location: Smithsonian Institution
Start: 1971 Museum of History and
Terminate: Indefinite Technology
Washington, D. C. 20560

Objective:

Characterize the role of the horse as a factor influencing various aspects of material cultural and certain behavior patterns of the major ethnic groups in northern Mexico and our Southwest, 1775 to 1875.

Approach:

The program grew out of an exhibition and symposium held in 1970 on the role of the horse as a factor influencing various aspects of material cultural and certain behavior patterns of the major ethnic groups in northern Mexico and our Southwest. The equipment of horse and rider evolved to a point where, in the period 1775 to 1875, marked influences and variations on the Spanish models are clearly visible. The military, domestic, commercial and recreational uses of the horse were reflected in a wide range of material artifacts. Develop exhibits at the Smithsonian, scholarly publications and lectures. An exhibit "Man Made Mobile-The Western Saddle" has been developed and is on exhibit at the Smithsonian's Renwick Gallery, Washington, D. C.

Florida

Identification and Control of the Major Gastrointestinal Parasites of Domesticated Animals

027

Investigator: R. E. Bradley
Start: July 1971
Terminate: December 1976

Location: University of Florida
Gainesville, Florida 32601

Objective:

Determine the incidence and distribution of major gastrointestinal parasites of domesticated animals in Florida and test chemotherapeutic and other control measures.

Approach:

Surveys will be conducted in geographic areas of Florida for gastrointestinal parasite incidence in representative groups of domesticated animals, including horses. The most important parasites will be identified and studied by the use of sentinel animals and sentinel herds of flocks. Parasitic disease incidence plus management practices will be analyzed by a computer program to determine the most effective control measures.

Hepatic Organic Anion Transport Mechanisms

028

Investigator: R. R. Gronwall
Start: 1975
Terminate: Indefinite

Location: College of Veterinary Medicine
University of Florida
Gainesville, Florida 32601

Objective: Not Provided

Virus-Host Cell Interactions and Interferon in Equine Infectious Animals

029

Investigator: K. D. Ley
Start: January 1972
Terminate: June 1975

Location: University of Florida
Gainesville, Florida 32601

Objectives:

Develop an improved method of assay for the virus of Equine Infectious Anemia (EIA). Elucidate the role of interferon in horses chronically infected with EIA. Evaluate the potential of interferon for treatment of EIA.

Approach:

Use cell culture methods to measure radiouridine uptake and other changes which may be related to replication of EIA virus. As a means of ascertaining the role of interferon in the virus-host cell interaction of equine infectious anemia, determine whether or not leukocytes from EIA infected horses have the same ability to produce interferon in vitro as do leukocytes from uninfected horses. Determine EIA Virus sensitivity to the action of interferon in vitro and evaluate the effect of parenteral injection or endogenous stimulation of interferon on prevention of elimination of chronic EIA in horses.

Nutrient Requirements for Optimum Growth and Development of the
Young Horse

030

Investigator: E. A. Ott
Start: July 1973
Terminate: September 1975

Location: University of Florida
Gainesville, Florida 32601

Objectives:

Determine the protein and amino acid requirements of the growing foal. Characterize optimum bone development for the growing performance horse. Determine the mineral requirements of the growing foal for optimum bone development. Determine the vitamin needs of the growing foal for optimum bone development.

Approach:

Optimum bone development will be determined by comparison of growing foals to a standard established by characterizing the bones of "sound" and "unsound" mature performance horses. Nutrient requirements will be determined by balance trials and short and long term feeding trials. Nutrient requirements for optimum growth and development of performance horses will be verified by imposing the stress of training and perhaps racing on the test animals. Comparisons of confined horses receiving controlled nutrient intake programs with supplemented pasture programs will also be included.

Physiology of Digestion in the Horse

031

Investigator: E. A. Ott
Start: July 1971
Terminate: June 1976

Location: University of Florida
Gainesville, Florida 32601

Objectives:

Develop techniques for the study of the mechanisms of digestion and absorption in the horse. Identify dietary factors influencing the digestion and absorption of specific nutrients by the horse. Identify the factors influencing fermentation in the cecum and colon, the products of the fermentation and the extent to which they satisfy the animal's nutrient requirements.

Approach:

Cecal fistulated horses allowing access to the ileal-cecal orifice will be used in conjunction with conventional digestion studies to elucidate the changes taking place in the various areas of the digestive system. The influence of ration type and nutrient source on the site of digestion and absorption will be studied. Dietary factors influencing cecal fermentation will be determined by sampling the cecal contents after ration changes. Absorption of fermentation products will be determined by isotopic labeling.

Control Estrus Onset and Ovulation In Mares

032

Investigator: D. C. Sharp
Start: July 1974
Terminate: June 1979

Location: University of Florida
Gainesville, Florida 32601

Objectives:

Determine cyclic endocrine changes associated with the onset of estrus and ovulation in regularly cycling mares. Determine endocrine patterns in mares with abnormal reproductive cycles. Characterize the relationships among the endocrine hormones and determine the physiologic importance of their interactions.

Approach:

Determine normal and abnormal hormonal patterns by radioimmunoassay. Compare and correlate patterns by least squares regression analyses. Neutralize hormones sequentially with specific antisera and observe physiological effect.

Luteolytic Process in Mares

033

Investigator: D. C. Sharp
Start: July 1974
Terminate: June 1979

Location: University of Florida
Gainesville, Florida 32601

Objectives:

Assess the use of luteolytic compounds for estrous cycle synchronization, abortion-induction, and treatment of retained corpus luteum. Determine the mechanism of uterine-induced luteolysis in mares.

Approach:

Administer luteolytic agents at various times of cycle and/or pregnancy. Determine uterine secretion of possible luteolytic agents and determine effect of same on corpus luteum.

Preliminary Veterinary Science Research

034

Investigator: E. F. Simpson
Start: June 1968
Terminate: January 1999

Location: University of Florida
Gainesville, Florida 32601

Objectives:

Investigate current problems on: sterility and lameness of horses; infectious anemia of horses; anthelmintic evaluation in horses, poultry; and other entities.

Approach:

Examine clinical signs, lesions, diagnosis, experimentally infect; evaluate antibiotics for prevention and treatment; identify toxins; make chemical-biological analyses; characterize disease; characterize microorganisms and nutritional deficiencies producing sterility; evaluate rations and rate of bone formation, lameness by diagnostic X-ray; cultivate virus in vitro; develop diagnostic tests and vaccine; survey parasites and evaluate anthelmintic

efficacy and safety; continue characterization of antigenic nature; develop more effective vaccine.

Georgia

Pharmacology of Nerve-Muscle Systems

035

Investigator: J. M. Bowen
Start: May 1972
Terminate: 1975

Location: College of Veterinary Medicine
University of Georgia
Athens, Georgia 30601

Objectives and Approach:

The comparative pharmacology and physiology of neuromuscular transmission is being investigated in the frog, dog, cat, pig, cow, goat, and pony. Effects of d-tubocurarine and succinylcholine on miniature and end-plate potential amplitudes and frequencies in each specie will be determined. Alterations in frequency of nerve stimulation and iontophoretic application of calcium ions will be utilized to record transmitter-end-plate potential dose-response curves for pharmacokinetic analysis. Centrally acting muscle relaxants will be evaluated by use of the pectineus reflex and the H-reflex in the dog. Special attention will be given the influence of the muscle spindle on response to these drugs. The origin of positive potentials of denervation in the canine pectineus muscle will be determined. A digital computer will be employed for measurement of end-plate potentials, miniature end-plate potentials, and positive potentials of denervation, and for analysis of the pectineus reflex.

Normal and Abnormal Physiology in Domestic Animals

036

Investigator: D. D. Goetsch
Start: July 1974
Terminate: June 1975

Location: Agricultural Experiment Station
University of Georgia
Athens, Georgia 30601

Objective:

Study normal and abnormal physiology and clinical conditions relating to neuromotor and neurosensory mechanisms, reproduction, and digestive and metabolic diseases of domestic animals.

Approach:

Study the neuromotor and neurosensory mechanisms including muscle activity, electromyography of clinical and subclinical conditions, neuromuscular transmission, spinal reflexes, and drugs and clinical conditions affecting cardiac function. The studies in reproduction include investigations of prostaglandin effect on estrus synchronization in the mare. The digestive and metabolic disease studies encompass volatile fatty acid utilization by horses, glucagon effects on experimentally induced myocardial infarction, glucagon effects on the electrical activity of the heart, pulmonary artery ligation effects, auto-

transplantation of lung tissue, normal and diseased glomeruli indigestion in ruminants, shock studies in domestic animals, intestinal enzyme studies and carbohydrate and fat metabolism in the newborn and adult animal.

Studies on Anterior Pituitary Hormones

037

Investigator:	A. E. Wilhelmi	Location:	Department of Biochemistry
Start:	1974		School of Dentistry
Terminate:	Indefinite		Emory University
			Atlanta, Georgia 30303

Objective:

Isolate, purify and compare intact and partially degraded growth hormones. Determine chemical structures responsible for biological activity of growth hormones.

Approach:

Study the comparative biochemistry of the growth hormones of horse, man, monkey, ox, sheep, pig, dog, and some fish.

Illinois

Nutritional Factors Influencing Equine Growth and Productivity

038

Investigator:	W. W. Albert	Location:	Agricultural Experiment Station
Start:	October 1971		University of Illinois
Terminate:	June 1977		Urbana, Illinois 61801

Objectives:

Determine (a) synthesis and absorption of amino acid in the cecum and large intestine quantitatively, (b) digestibility of specific feedstuffs for the horse and pony prececally and and totally, and (c) energy needs for lactation and varying degrees of exercise of the horse.

Approach:

For cecal protein synthesis and digestion determination, radiolabelled sulfur will be placed in the cecum of a cecally fistulated pony and methionine separated from plasma. Quantative estimates of digestion of bacterial protein will employ radiolabelled sulfur or carbon to label protein during synthesis. Disappearance of label between the cecum and feces will quantitate post-cecal digestion, a dilution of label will serve to estimate metabolized protein plus bacterial protein synthesis. Quarterhorse mares currently being used in lactation studies will be employed similarly next year. Milk composition and blood parameters will be monitored throughout six months of lactation. Growing ponies used for study of energy requirements for exercise will be individually fed 75 to 125% of estimated energy required and exercised with an exercise wheel from one eight hours per day for three months. Energy needs for weight maintenance or optimal weight gain with different amounts of exercise will be estimated by regression.

Investigator: J. M. Bahr
Start: July 1975
Terminate: June 1978

Location: Agricultural Experiment Station
University of Illinois
Urbana, Illinois 61801

Objectives:

(1) Determine if the ovary in response to gonadotrophin stimulation primarily releases, synthesizes and releases, or synthesizes the three gonadal steroids, estrogen, progesterone and testosterone. (2) Test if these follicular steroids are released independently of each other or whether the follicle acts as a unit in their synthesis and release. (3) Examine the role of follicular steroids in the development, maturation, and ovulation of the ovum and subsequent luteinization. (4) Measure the ability of gonadotrophin sub-units to stimulate steroidogenesis and ovulation. (5) Define further the role of the adrenergic nerves in steroid synthesis and release.

Approach:

In preliminary experiments, both immature and mature rabbits will be used. Gonadotrophins, anti-steroids, steroids, or adrenergic blocking agents will be injected directly into the ovarian follicles. Intrafollicular injections allow one to study the local effect of specific reagents, circumvents systemic effects and permits one to use smaller quantities of the reagents. To determine if any of these treatments affect ovarian steroid synthesis and/or release, blood will be collected from the ovarian vein both before and after treatments. Estrogen, progesterone, and testosterone concentrations in the blood will be measured by radio-immunoassay. Histological studies will also be done on the ovaries to ascertain if these reagents affect the normal development, maturation, ovulation and subsequent luteinization of the ovarian follicles. Once preliminary data has been obtained from rabbits, these objectives will be tested also in the pig.

Mechanisms Controlling Sequence of Events at Ovulation

040

Investigator: P. J. Dziuk
Start: February 1969
Terminate: June 1975

Location: University of Illinois
Urbana, Illinois 61801

Objective:

Study those aspects of ovulation that appear to be amenable to manipulation and control and attempt to devise methods for control and appointment of the time of ovulation in pigs, sheep and ponies.

Approach:

The time of ovulation following an injection of human chorionic gonadotrophin (HCG) and the stages of maturation of the oocyte of the pony will be determined by examining fertilized eggs and embryos. In sheep artificially inseminate relative to HCG to determine fertility under a scheme to control ovulation time. In gilts look for an endocrine relationship to delayed puberty such as high levels of progesterone in the plasma of noncyclic gilts. Study a possible relationship between a response to follicle stimulating hormone and subsequent numbers of ovulations.

Investigator: C. N. Graves
Start: 1974
Terminate: Indefinite

Location: Agricultural Experiment Station
University of Illinois
Urbana, Illinois 61801

Objective:

Characterize the various proteinases of the mammalian spermatozoa, as to their location in the acrosome, their activity and function during maturation, capacitation, fertilization and in vitro storage, and determine if these proteinases may be reversibly inhibited, thereby prolonging the fertilizable life of spermatozoa during in vitro storage.

Approach:

Spermatozoan acrosomal proteinases will be isolated and characterized during their maturation in the testes, following incubation both in utero and in vitro, and following various periods of storage. The influence of natural inhibitors from both seminal plasma and plants as well as synthetic inhibitors will be assayed for their effect both in prolonging the fertile life of the spermatozoa during storage and for their contraceptive effect following natural mating.

Factors Affecting Embryogenesis in Mammals

Investigator: C. N. Graves
Start: 1974
Terminate: Indefinite

Location: Agricultural Experiment Station
University of Illinois
Urbana, Illinois 61801

Objective:

Study the physiological, morphological and biochemical changes occurring within the female tract with the aim of improving embryo survival following transfer. Determine the influence of stress factors such as aging or freezing on both ova and embryos.

Approach:

Changes in the female tract and fluids will be investigated in vivo by pH, CO₂ and O₂ electrodes, response to various drugs and ability to maintain an embryo in a viable state. Fluids will be analyzed in vitro by chemical analyses, enzyme reactions and acrylamide electrophoresis techniques. The optimum media and cooling rate for long-time storage of embryos will be determined by culture and development following transfer. Fresh and stored ram, boar, stallion, rabbit and frog spermatozoa are included in the study.

Physical and Biological Characteristics of Equine Fetal Immuno-
globulins Resulting from in Utero Inoculation

043

Investigator: D. Morgan
Start: October 1974
Terminate: October 1975

Location: University of Illinois
Urbana, Illinois 61801

Objectives:

Characterize the fetal immunoglobulins formed after in utero inoculation and determine the sequence of appearance and efficiency of neutralization.

Approach:

Equine fetuses will be inoculated with Venezuelan Equine Encephalitis vaccine virus at 8 months gestation and subsequently removed by surgery 3 to 7 weeks later. The type of immunoglobulins will be determined and then used in neutralization tests for VEE antibody. The sequence of appearance of the various immunoglobulins produced by the equine fetus and inoculated adult horses will be studied.

Interactions of Toxic Metal Species with Biomolecules

044

Investigator: D. F. Natusch
Start: 1973
Terminate: Indefinite

Location: Department of Chemistry
University of Illinois
Urbana, Illinois 61801

Objective and Approach: Not Provided

Indiana

Nutrient Requirements and Interrelationships

045

Investigator: W. M. Beeson
Start: May 1965
Terminate: June 1975

Location: Department of Animal Science
Purdue University
Lafayette, Indiana 47907

Objectives:

Determine the nutrient requirements of animals where voids exist and their biological interrelationships to various nutrients and feed additives with special emphasis on cattle, horses, sheep and swine. Evaluate the nutritional value of new high-protein cereal grains.

Approach:

Nutrient requirements, biological interrelationships and unidentified factors will be established by using purified, semipurified and semipractical diets with growth studies and balance techniques. New high-protein cereal grains will be tested by growth studies, biological evaluation of the protein and chemical nature of the nutrients. Feed additives will be mostly involved with feeding experiments with animals and a study of their metabolic function.

Helminth Parasites of Domestic Livestock

046

Investigator: D. G. Bennett Location: Purdue University
Start: May 1966 Lafayette, Indiana 47907
Terminate: June 1976

Objectives:

Define parasite problems in Indiana livestock. Reduce losses due to helminth parasites in livestock.

Approach:

Conduct post mortem surveys of species and numbers of helminths in naturally infected livestock. Animals purchased specifically for the research will be used. Conduct critical trials for evaluating new and currently available anthelmintics for livestock. Compare different anthelmintics in conventional farm situations. Use controlled experimental design. Evaluate methods of administration of anthelmintics to livestock. Conduct comparative production and performance studies of livestock on various levels of nutrition experimentally infected with helminths.

Equine Growth and Development

047

Investigator: B. H. Crawford Location: Department of Animal Science
Start: July 1973 Purdue University
Terminate: 1975 Lafayette, Indiana 47907

Objectives:

Determine the effect of protein level and exercise on the growth and development of bone, muscle and connective tissue in the rapid growing equine. Investigate methods of characterizing growth and strength of skeletal structures in terms of composition of bone, muscle and connective tissue and the resulting relationship to optimum development.

Approach:

Effects of three protein levels, 11, 14 and 17% respectively, and exercise will be studied on the development of bone, muscle and connective tissue in the rapid growing equine. Growth, radiological and blood data will be collected on the live animal and related to blood, bone, tendon and muscle samples taken at necropsy to characterize optimum skeletal development.

Properties of Immunoglobulins of Domestic Animals

048

Investigator: M. J. Freeman Location: Purdue University
Start: July 1969 Lafayette, Indiana 47907
Terminate: Indefinite

Objective:

Elucidate and compare the spectrum and function of the antibodies, or immunoglobulins, of the major species of domesticated mammals.

Approach:

Experimental groups of sheep, cattle, and horses will be immunized with various soluble or particulate antigens. Different routes and schemes of immunization may be evaluated. Sera for evaluation will be obtained periodically after primary, secondary or subsequent courses of immunization. Several immunologic methods will be used to determine the spectrum and functional properties of serum antibodies throughout the response. Serum will be fractionated by several methods to aid in the characterization of individual classes of antibody.

Metabolic and Congenital Bone Diseases of Animals

049

Investigator: A. M. Gallina

Location: Purdue University

Start: July 1971

Lafayette, Indiana 47907

Terminate: June 1976

Objective:

Evaluate and experimentally reproduce bone diseases seen in the field.

Approach:

Nutritional deficiencies, arthritic conditions, infections and unexplained pathologic fractures will be investigated. Disease conditions will be reproduced under controlled experimental conditions simulating field conditions. Quantitative estimates will be made by the use of fluorescent multiband labels, radiography, microradiography, histochemistry, and histologic examinations. Radioisotopes and autoradiography will be utilized when feasible. Clinical biochemistry and microbiology will be used extensively to evaluate the observed changes.

Inapparent Viral Infections

050

Investigator: D. P. Gustafson

Location: Purdue University

Start: July 1972

West Lafayette, Indiana 47907

Terminate: June 1977

Objectives:

Obtain information on conditions under which pseudorabies and other viruses are intermittently shed from animals in symptomatic remission. Determine the role of viral isolates in chronic equine diarrhea and continue development of therapeutic means for coping with chronic equine diarrhea.

Approach:

Attempts will be made to isolate viruses from selected cases of chronic equine diarrhea and develop and evaluate prophylactic or therapeutic measures including anti-serum, attenuated viral vaccines and inactivated viral vaccines in the remission.

Investigator: J. E. Lund
Start: July 1971
Terminate: June 1976

Location: Purdue University
Lafayette, Indiana 47907

Objective:

Diagnose and categorize the infectious and non-infectious blood diseases of domestic animals in the State of Indiana.

Approach:

Blood samples of animals presented to the Purdue Veterinary Clinics will be examined cytologically and chemically for the presence of hematologic disease. Field studies will be performed when the situation warrants this approach. Those diseases that can be experimentally reproduced will be intensively studied in an attempt to develop prophylactic or therapeutic measures.

Immune Response of the Horse

052

Investigator: R. L. Morter
Start: April 1965
Terminate: June 1975

Location: Purdue University
Lafayette, Indiana 47907

Objectives:

Elucidate the immune response of the horse and purify, characterize and define the biological activity of the various immunoglobulins produced. Definition of the relationship of these immunoglobulins to various immunologically mediated diseases will be undertaken.

Approach:

Horses and ponies will be immunized with a series of antigens with or without adjuvant. Antigens of different chemical composition and molecular structure will be included. Following immunization serum will be harvested and chemically fractionated to obtain purified immunoglobulins. Specific antibodies to each of the immunoglobulins will be produced in goats or rabbits to provide the necessary immunoreagents for immunoelectrophoresis, radioimmunoelectrophoresis, antigen binding tests, and other immunologic tests that would be indicated to define the biologic function of the immunoglobulins. Amyloidosis or uveitis will be experimentally induced in ponies or horses. Immunocytological methods will be utilized to elucidate the role of the immune response in the pathogenetic mechanism of the diseases. The technics to be employed will include fluorescent antibody, immunoferritin, immunoperoxidase, and elution of immune complexes from affected tissues. Cytologic evaluation would be accomplished with light, ultraviolet and electron microscopy.

Investigator: F. R. Robinson
Start: July 1975
Terminate: June 1980

Location: Purdue University
West Lafayette, Indiana 47907

Objectives:

Investigate environmental toxins causing disease in domestic animals in Indiana and develop diagnostic techniques and therapeutic regimens to more promptly and accurately diagnose toxicologic diseases in animals and to effectively treat them.

Approach:

Selected field cases will be studied to elucidate the nature and response to the toxin, characterize the toxicologic and pathologic reactions, and apply the research results to field problems of greatest importance. Specific toxicologic disease problems will be selected for more intensive investigation including the establishment of the toxic level of copper for the horse and describing biochemically and pathologically the pathogenesis of acute and chronic equine copper toxicity.

Orthopedic Pathology of Domestic Animals

054

Investigator: D. C. Van Sickle
Start: July 1975
Terminate: July 1980

Location: Purdue University
West Lafayette, Indiana 47907

Objectives:

Standardize an experimental model of degenerative joint disease in the horse. Determine the efficacy of various drugs in preventing or ameliorating experimental equine degenerative joint disease. Study the various tissues of equine joints in health and disease by transmission and scanning electron microscopy. Determine the in-vivo biochemical mechanical forces acting on the equine metacarpus and correlate these factors with results in morphological perimeters. Design and test an improved method of equine fracture fixation.

Approach:

A drug-induced experimental model of degenerative joint disease in the horse has been developed and will be characterized grossly, radiographically, histologically, histochemically and with electron microscopy. The availability of a standardized experimental model will permit testing the pharmacodynamics and efficacy of various anti-inflammatory agents. An in-vivo stress analysis of the equine long bone will be accomplished and coupled with mathematical analysis to produce a quantitative computer model of living bone. This model will be manipulated to determine the minimum and maximum load histories of bone. This data will permit a biomechanical approach to fracture fixation and permit the evaluation of new orthopedic methods and new alloys for equine fracture fixation.

Investigator: J. F. Vanvleet Location: Purdue University
Start: July 1968 Lafayette, Indiana 47907
Terminate: June 1978

Objectives:

Outline the pathogenesis of selenium - vitamin E (Se-E) deficiency diseases and a group of related diseases including azoturia of horses, pancreatic necrosis of dogs, steatitis of cats and porcine stress syndrome or pale soft exudative pork syndrome. Develop effective and safe control and therapeutic procedures for the diseases.

Approach:

Study the clinical and pathologic changes during the course of the subject spontaneous or experimentally-produced diseases using clinical examination, gross observation, laboratory tests, and microscopy and determine the value of selenium and vitamin E in their prevention.

Iowa

The Effects of Mycotoxins on Animals

056

Investigator: S. J. Cysewski Location: National Animal Disease Center
Start: June 1965 P. O. Box 70
Terminate: February 1976 Ames, Iowa 50010

Objectives:

Study the biological effects of mycotoxins on domesticated animals. Correlate the clinical, clinical pathological and histopathological changes following the administration of mycotoxin to selected animal species. Develop criteria for the diagnosis and treatment of specific intoxications.

Approach:

Produce in culture, extract and administer known quantities of crude, refined or purified mycotoxins to susceptible subjects including appropriate laboratory animals, poultry, calves, sheep, pigs, and horses. Conduct chemical and biochemical characterizations of mycotoxin extracts and their effects on animals through biochemical, clinicopathological and histological examinations. Conduct examinations so as to permit temporal association between deviations from normal form and function with toxin administration. Develop presumptive and definitive criteria for diagnosis of specific mycotoxicoses and attempt treatment to counteract biological effects of toxin consumption.

Swamp Fever in Equine

057

Investigator: W. A. Malmquist
Start: March 1973
Terminate: March 1978

Location: National Animal Disease Center
P. O. Box 70
Ames, Iowa 50010

Objectives:

Produce equine infectious anemia (EIA) antigen in infected cell cultures and determine the optimal conditions for its production. To characterize the virus and antigen physically, chemically and serologically and produce modification of its virulence for the natural host.

Approach:

Established cell lines will be infected with EIA virus. Virus and antigen will be isolated from various components of the cell culture system at different periods of time using polyethylene glycol precipitation. The antigen will be assayed by the radial immunodiffusion technique. Infected cells will be used at various growth periods for electron microscopy and immunofluorescence studies. EIA virus propagated in vitro for extensive periods will be inoculated into horses to indicate changes in antigenicity and virulence.

Equine Influenza Vaccine

058

Investigator: T. W. Tamoglia
Start: July 1975
Terminate: Indefinite

Location: Animal and Plant Health
Inspection Service, USDA
Veterinary Services
P. O. Box 70
Ames, Iowa 50010

Objective:

Correlate host animal protection against challenge of immunity with laboratory animal serological response to vaccine containing A-Equi-1 and A-Equi-2 influenza virus.

Approach:

Prepare a reference challenge virus for both viruses. Assay for clinical response in SN seronegative equines. Prepare reference vaccines. Determine degree of protection against challenge of immunity elicited by reference vaccines. Determine levels of serological response in guinea pigs elicited by reference vaccines and correlate with degree of protection in equines.

Kansas

Nutritional and Physiological Responses in Horses

059

Investigator:	L. H. Harbers	Location:	Animal Science & Industry Dept.
Start:	May 1974		Kansas State University
Terminate:	June 1976		Manhattan, Kansas 66504

Objectives:

Evaluate locally produced or processed feedstuffs for the pleasure horse. Determine the effects of different planes of nutrition on the physiology of the exercised horse and on the reproduction of mares.

Approach:

Feedstuffs will be given to young and mature horses maintained in metabolism stalls to determine digestible nutrients and energy. Subsequent feeding trials involving growth or maintenance, or both, will be made using the classical statistical designs for nutritional studies. Mature horses will be used to study the physiological responses of overfed animals to strenuous exercise. Respiration and blood studies will be made prior to, and just after, exercise under varying environmental conditions (temperature, humidity, thermal discomfort index). Mares will be subjected to various treatments involving plane of nutrition, exogenous hormones, and light to reduce variability in cycling animals and to control anestrous.

Reducing Perinatal Losses in Livestock Due to Genetic Diseases

060

Investigator:	H. W. Leipold	Location:	Department of Pathology
Start:	April 1975		Kansas State University
Terminate:	March 1978		Manhattan, Kansas 66504

Objectives:

Enumerate and describe perinatal losses occurring in livestock, investigate causes, and identify control procedures. Investigate the causes of these pathologic processes. Develop comparative models of developmental pathology and pathologic processes in mammals.

Approach:

Investigations will be of three kinds: pathologic, breeding trials, and field surveys. Animals referred to the Center for Birth Defects will be necropsied and detailed histopathologic examinations will be performed. Attempts will be made to reproduce those seemingly of genetic origin which require additional genetic evidence through planned breeding trials. Information on the etiology and incidence of genetic disorders will be sought by visits to ranches and farms where losses are occurring.

Investigator: J. E. Mosier
Start: September 1967
Terminate: June 1975

Location: Kansas State University
Manhattan, Kansas 66504

Objectives:

Provide the instrumentation, animal resources, and initial supplies for preliminary studies of surgical procedures needed to provide experimental models for the animal scientists and for the initiation of investigations concerning the correcting or control of those conditions which are presented to the veterinary clinic and which are potentially amendable to surgical repair.

Approach:

Specific problems will be selected from the surgical or research area. Projects undertaken will be funded for a preliminary study. Those which cannot be concluded in a short interval or which show need for additional investigation will be assigned a number and further funding will be requested for the specific project.

Erythrocyte Enzymopathies in Animals

062

Investigator: J. E. Smith
Start: July 1972
Terminate: June 1977

Location: Kansas State University
Manhattan, Kansas 66504

Objectives:

Characterize a partial gamma-glutamylcysteine synthetase deficiency in sheep and its effects on erythrocyte integrity under normal stress conditions. Search for other erythrocyte enzymopathies in horses and other animals that may serve as models for man.

Approach:

Characterization of the gamma-glutamylcysteine synthetase of glutathione deficient sheep, in vivo manifestations and in vitro effects of erythrocyte glutathione deficiency, and the relationship of the metabolic defect to overall glutathione metabolism. All experiments will be performed with low glutathione erythrocytes paired with red cells from normal sheep of similar breeding. If appropriate, normal human blood will also be utilized.

Kentucky

Dietary Factors Affecting Calcium and Phosphorus Utilization in the Equine

063

Investigator: J. P. Baker
Start: September 1971
Terminate: June 1976

Location: University of Kentucky
Lexington, Kentucky 40506

Objectives:

Determine the influence of dietary ratio of calcium to phosphorus on calcium and phosphorus absorption in the equine. Determine the influence of dietary lactate and intestinal hydrogen ion concentration on the absorption and utilization of calcium and phosphorus in the equine. Determine the availability of dietary sources of calcium and phosphorus for the equine.

Approach:

Six ponies will be used to determine the influence of different ratios of calcium to phosphorus on the absorption of the minerals as measured by balance trials and by an isotope dilution technique. The effect of diet on the lactate content and pH of the equine gastro-intestinal tract and the influence of these factors on calcium and phosphorus absorption will be measured. Absorption of calcium and phosphorus from supplemental sources containing the minerals in various ratios will be measured in ponies.

Factors Affecting Energy Utilization and Feeding Behavior in the Equine

064

Investigator: J. P. Baker
Start: November 1967
Terminate: June 1978

Location: University of Kentucky
Lexington, Kentucky 40506

Objectives:

Determine the influence of dietary changes on the production and absorption of glucose and volatile fatty acids in the different segments of the equine intestinal tract. Determine the influence of physical and chemical composition of the diet on appetite and feeding behavior. Cecal-fistulated and portal- and carotid-catheterized ponies will be used to determine the influence of fiber content, stage of roughage maturity, feed particle size and method of feed processing on glucose and VFA production and absorption. Cecal-fistulated horses and time-lapse photography will be used to determine the influence of roughage and concentrate levels in the diet on feeding behavior.

Approach:

Disappearance of dietary starch and cellulose from different segments of the equine intestinal tract will be measured using the chromic oxide ratio technique with fecal samples and with digesta samples drawn from permanent fistulae installed in the ceca and the dorsal and ventral colons of horses fed conventional hay-grain rations. Glucose and VFA determinations will be made on the digesta samples also. After base values for starch and cellulose disappearance and for glucose and VFA production have been established, the influence of changes in dietary fiber and starch upon digestive activity in the different

Factors Affecting Energy Utilization and Feeding Behavior
in the Equine (continued)

064

segments of the tract will be assessed. Differences in portal and carotid blood levels of glucose and VFA will be used to estimate absorption from the caudal portions of the equine intestinal tract.

Factors Affecting Protein Requirements and Utilization in the Equine

065

Investigator: J. P. Baker
Start: January 1968
Terminate: June 1978

Location: University of Kentucky
Lexington, Kentucky 40506

Objectives:

Measure the extent of degradation of different sources of dietary protein in different segments of the equine intestinal tract. Determine the influence of different sources of dietary protein upon utilization of other nutrients. Determine the quantitative dietary protein requirement for optimum growth and development of the 2 to 6 months old horse.

Approach:

Re-entrant ileo-cecal cannulae and an indicator (Cr (2) O (3)) will be used to determine pre- and post-cecal digestion of various proteins. Cecal-fistulated horses will be used to determine influence of various sources of protein when fed and when cecally infused, on cellulose digestion. Colts weaned at 2 months of age will be fed graded levels of protein to determine protein requirements, for growth.

Pathology of Spontaneous Diseases of the Horse

066

Investigator: M. W. Crowe
Start: May 1961
Terminate: December 1976

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objectives:

Describe the gross and microscopic anatomy observed in spontaneously occurring diseases of the horse and identify agents or factors responsible for the disease.

Approach:

Complete necropsy examinations will be performed on fetuses, foals and horses. Samples of organs will be collected and processed for histopathologic examination. Other tissues will be collected in an attempt to identify and characterize the infectious or chemical agents that may be the etiologic agent of the disease. Experimental animals will be exposed to suspect agents in an attempt to produce the disease. The pathogenesis of the disease will be studied on entities that are reproduceable.

Pathogenesis of Disease Induced by Equine Herpesviruses

067

Investigator: R. W. Darlington
Start: August 1974
Terminate: June 1977

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objectives:

Determine if a disease process can be induced in foals by equine herpesvirus 3, whether horse macrophages can support the replication of EHV-1, 2 and 3 and establish the morphologic and biologic pattern of EHV-3 replication in equine cells.

Approach:

Susceptible foals will be inoculated with EHV-3 and their clinical, virologic and immune responses measured. Gross and histopathologic responses to infection will be characterized. The ability of horse macrophages to support replication of the herpesviruses will be determined by in-vitro attempts to cultivate the virus and assessment of its ability to replicate by virologic and electron microscopic techniques. The morphologic and biologic pattern of EHV-3 replication in cell cultures of equine origin will be described from virologic and electron microscopic studies of cultures of established cell lines infected by the virus.

Controlling Internal Parasites of the Horse

068

Investigator: J. H. Drudge
Start: January 1947
Terminate: June 1977

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objectives:

Evaluate efficacy and safety of chemotherapeutic agents for use in the control of the common internal parasites of horses. Study prepatent development, pathogenesis and pathology of infections of internal parasites of horses. Investigate epizootiology of *Strongylus westeri*.

Approach:

Critical testing method will be used to evaluate efficacy of drugs for removal of parasites from infected horses. Estimates of efficacy by egg and larval counts at periodic intervals through field trial protocols will be carried out to supplement critical data and evaluate performance of drugs under natural conditions. Tests to determine species susceptibility to chemotherapeutic action of drugs will be conducted with monospecific infections experimentally induced in parasite free foals.

Hemolysins of Staphylococci and Pseudomonas Aeruginosa in Horses

069

Investigator: P. V. Liu
Start: 1963
Terminate: Indefinite

Location: Health Sciences Center
University of Louisville
Louisville, Kentucky 40201

Objective and Approach: Not provided

Investigator: W. H. McCollum
Start: August 1974
Terminate: June 1979

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objective:

Isolate and characterize viral agents causing undiagnosed infections in equine fetuses, foals and mature horses and to assess the significance of such agents in equine health.

Approach:

A search for viral agents using standard virologic methods will be conducted in clinically definable epidemics of disease occurring among horses. Those submitted for necropsy diagnosis with conditions suggesting viral etiology will be investigated by the same methods. The ability of agents isolated to produce disease will be assessed by inoculation of experimental foals and horses. The response of such subjects will be monitored clinically, virologically and immunologically. Serological methods will be employed to establish etiology and to study epizootiology of diseases from which viral agents are isolated.

Soluble Proteins of Equine Blood and Mammary Secretions -
Qualitative and Quantitative Characterization

071

Investigator: D. O. Morgan
Start: July 1971
Terminate: June 1975

Location: University of Kentucky
Lexington, Kentucky 40506

Objectives:

Define the electrophoretic profile of the blood serum proteins of the equine as it evolves from the neonate to the aged animal. Determine times and capacities for absorption of intact macromolecules by the neonatal equine intestine. Characterize equine immunoglobulins and their biological role in the defense mechanisms of the equine.

Approach:

Normal serum protein profiles will be determined by standard physico-chemical procedures on blood serum samples from various breeds and age groups of horses from the neonate to maturity. Similar procedures will be used to investigate changes in serum protein profiles induced by specific diseases and immunizations, with special emphasis on the immunoglobulins. Mechanisms involved in absorption of macromolecules by the neonatal intestine will be studied in horses by the experimental feedings of foreign protein substances and by organ culture technics.

Quantitation of Hypophyseal and Ovarian Hormones in Mares

072

Investigator: O. P. Sharma
Start: September 1973
Terminate: June 1976

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objectives:

Determine the blood plasma concentrations of the hypophyseal and ovarian hormones of mares during proestrus, estrus, metestrus, diestrus and anestrus. Investigate the hormonal relationship between the ovary and the pituitary gland of the mare.

Approach:

Sensitive hormonal assay techniques (gas-liquid chromatography, competitive protein binding, radioimmunoassay) will be applied to determination of blood hormone concentrations during all stages of estrus in the mare. The findings will be correlated with psychic manifestations of sexual behavior.

Etiology, Pathogenesis and Epizootiology of Acute Bacterial Hepatitis of Foals

073

Investigator: T. W. Swerczek
Start: January 1975
Terminate: December 1977

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objective:

Describe the pathogenesis, develop clinical and laboratory diagnostic parameters and cultivate the etiologic agent of acute bacterial hepatitis of foals.

Approach:

Using infected tissues and cultures prepared from such tissues, foals and older horses will be infected by inoculation. The pathogenesis of the infectious process will be studied by complete autopsy. Clinical pathologic alterations will be investigated in diseased animals. Tissues from infected horses will be used as inocula in attempts to propagate the organism in artificial mediums.

Myxovirus Influenza A-Equi Antigenic Variations and Virus Reservoirs in Birds

074

Investigator: J. Wilson
Start: July 1972
Terminate: June 1975

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objectives:

Describe antigenic characteristics of currently active strains of myxovirus influenza A-equi. Search for possible feral bird reservoir host that may harbor strains identical or related to myxovirus influenza A-equi.

Approach:

Virologic surveillance of equine influenza will be carried out. Viruses isolated will be examined to determine their degree of antigenic relatedness to prototype equine viruses. A prospective search for myxovirus influenza A viruses among wild birds in contact with horse populations will explore the possibility of a reservoir of viruses infectious for the horse.

Louisiana

Chronic Obstructive Pulmonary Disease in Horses

075

Investigator: R. E. Beadle
Start: October 1975
Terminate: October 1979

Location: Louisiana State University
Baton Rouge, Louisiana 70803

Objectives:

Determine values of several respiratory parameters in both healthy horses and those having chronic obstructive respiratory disease. Determine effects of drugs on the values of respiratory parameters in horses having chronic respiratory disease. Determine incidence of chronic obstructive pulmonary disease in Louisiana horses.

Approach:

A survey among members of Louisiana Horse Breed Associations will determine incidence of the disease in the state. A fabricated whole body plethysmograph for horses will be used to measure airway resistance and thoracic gas volume and will be calibrated to read changes in thoracic gas volume. Values of measurements of airway resistance and total thoracic gas volume will be made on 10 healthy horses and 10 horses with chronic obstructive pulmonary disease, various parameters recorded and therapeutic regimes developed.

Internal Parasites of Horses: Diagnosis and Immunization, Strongylus
Vulgaris

076

Investigator: T. R. Bello
Start: July 1974
Terminate: June 1979

Location: Louisiana State University
Baton Rouge, Louisiana 70803

Objectives:

Develop methods of definitive serologic laboratory diagnosis of verminous arteritis and colic due to Strongylus vulgaris in the horse. Develop methods of immunization against Strongylus vulgaris in the horse.

Internal Parasites of Horses: Diagnosis and Immunization, Strongylus Vulgaris (continued)

076

Approach:

Monospecific infections will be produced in donar animals. Larvae obtained from these animals will be cultured in vitro and metabolic and somatic antigens prepared. Antigens will be tested immunologically and used to develop diagnostic antigens. Methods of immunization will include the testing of irradiated larvae and the larval antigens.

Lower Limb Skeletal Disease in Louisiana Racing Thoroughbreds

077

Investigator: P. F. Haynes

Location: Louisiana State University

Start: October 1975

Baton Rouge, Louisiana 70803

Terminate: October 1977

Objectives:

Correlate gross lesions and histopathologic and radiographic findings with clinical history and previous therapy in forelimbs of race horses destroyed for humane reasons. Document incidence of tendon, bone and joint diseases distal to carpus. Correlate information from post mortem specimens with clinical and radiographic findings in control animals. Determine effects of previous medical or surgical therapy. Develop data base for instruction and for further research.

Approach:

Both forelimbs will be disarticulated at radio-carpal joint from 50 horses destroyed at thoroughbred racing meets in Louisiana, and donated to Veterinary School. Radiographic identification evaluation and description of bone and joint status will be accomplished. Histopathologic and bacteriologic examinations will be done on specimens where indicated and calcium-phosphorous bone ash will be determined.

Improving Efficiency of Reproduction in the Mare

078

Investigator: J. L. Kreider

Location: Department of Animal Science

Start: January 1974

Louisiana State University

Terminate: December 1979

Baton Rouge, Louisiana 70803

Objectives:

Develop methods for controlling reproductive patterns in mares using estrous synchronization and induced ovulation. Study endocrine patterns as related to estrus, ovulation and changes in histology of the reproductive tract. Information will be used to develop a controlled breeding system for horses.

Approach:

Determine efficacy of recently developed estrous synchronizing agents in horses. These agents will be used in conjunction with ovulation inducing compounds to control estrus and ovulation. Circulating levels of gonadotropins and gonadal hormones will be measured and these measurements correlated with estrous, ovulation and changes in the histology of the reproductive tract. Information will be used to develop a controlled breeding system for horses.

Investigator: R. B. Lank
Start: January 1974
Terminate: January 1979

Location: Department of Veterinary Science
Louisiana State University
Baton Rouge, Louisiana 70803

Objectives:

Make epidemiologic observations essential to the development of a control program. Determine the role of biting insects such as the mosquito *Culex pipions quinquefasciatus*, the horse fly *Tabanus fuscicostatus*, and the stable fly *Stomoxys calcitrans* in the spread of EIA under various conditions. Improve the yield of EIA antigen from infected horse spleen, purify and characterize the antigen, and determine if the antigen can be produced in cell cultures.

Approach:

Periodic testing of bands of horses having at least a 20% rate of infection will be continued to determine any changes in morbidity. *Culex* mosquitoes will be fed on an acutely sick pony, and susceptible ponies will then be exposed to the mosquitoes at 7, 14, and 21 days post feeding. Horse flies will be partially fed on an acutely sick pony and then allowed to complete their blood meal on susceptible ponies at 1, 3, 10, and 30 minutes and 4 and 24 hours after initial feeding. There will be 25 flies per animal. Groups of horses will be chemically immunosuppressed or stressed climatically and then exposed to EIA virus. The yields of spleen antigen under these and control conditions will be determined. Chemical and physical procedures will be used to purify EIA antigen which will be characterized physically and biologically. A mosquito cell line and other cell lines of equine origin will be investigated for supporting viral replication and antigen production.

The Epidemiology, Diagnosis and Control of Equine Infectious Anemia

080

Investigator: E. E. Roth
Start: September 1966
Terminate: November 1976

Location: Louisiana State University
Baton Rouge, Louisiana 70803

Objectives:

Further the knowledge of the epidemiology, transmission and pathogenesis of EIA upon which to base practical control measures that will reduce the incidence of the disease. Continue evaluation and improvement of the immunodiffusion test. Continue studies to improve the preparation of antigen and reference positive serum and the methodology for conducting the immunodiffusion test for EIA. Further propagate, purify, and characterize the virus or viruses associated with EIA.

Approach:

The immunodiffusion test will be employed to test groups of horses for possible EIA. Various plans will be followed with the goal of reducing transmission by segregation. Other groups will be set up as closed herds and tested periodically. Acceptable biochemical, immunological and analytical chemical methods will be employed to extract and improve the EIA antigen and reference positive serum and attempts will be made to characterize the antigen. Methodology to be employed in the insect transmission studies will be developed.

Identification of Drugs Used Illicitly in Racehorses

081

Investigator:	C. R. Short	Location:	Louisiana State University
Start:	October 1975		Baton Rouge, Louisiana 70803
Terminate:	October 1977		

Objectives:

Determine which metabolites of methylphenidate produced by the horse may be useful in proving administration of the parent compound (Ritalin). Develop method for extraction of the drug and its metabolites from equine urine, plasma and saliva. Develop high pressure liquid chromatography technique for separation and quantification of methylphenidate and its metabolites. Determine the period of time which drug or its metabolite may be detected in urine, plasma and saliva following usual intravenous and intramuscular doses.

Approach:

Methylphenidate and its metabolites will be extracted from urine, blood plasma and saliva following administration of the drug with buffers of varying pH and organic solvents of varying polarity. A high pressure liquid chromatograph will be employed to assist in detection of the drug and its metabolites. They will be characterized by mass spectrometry. Methylphenidate will be injected into horses and specimens of urine, blood and saliva collected for analysis at intervals over a 24 hour period.

Surveillance of Tropical Diseases, Including Equine Viral Encephalitides

082

Investigator:	J. C. Swartzwelder	Location:	School of Medicine
Start:	1974		Louisiana State University
Terminate:	Indefinite		Baton Rouge, Louisiana 70803

Objectives:

Determine physiological, genetic and environmental factors which would be relevant to future control or eradication of tropical diseases, including equine viral encephalitides.

Approach:

Study animal serum antibodies and insect vectors of Venezuelan equine encephalitis (VEE) virus, eastern (EEE) and western (WEE) encephalitis and St. Louis (SLE) encephalitis.

Evaluate New Anthelmintics for Domesticated Animals and Poultry

083

Investigator:	M. L. Colglazier	Location:	Animal Parasitology Institute
Start:	November 1963		Agricultural Research Center
Terminate:	January 1979		Beltsville, Maryland 20705

Objectives:

Discover, develop, and evaluate safe, efficient anthelmintics and other chemical measures against worm parasites of horses, sheep, poultry and other domestic animals.

Approach:

Evaluate selected chemicals on the basis of safety, efficacy, and practicability. Selection predicated on anthelmintic activity in laboratory or other animals and on chemical or physiological relationships with known antiparasitic compounds. Use established or improved techniques of critical and controlled tests to determine efficacy against both adult and immature parasites. Give drugs by capsule, drench, parenteral injection, or admixed with feed. Establish optimal and maximal tolerated dosages. Study resistance phenomena among parasite strains and species exposed to anti-parasitic drugs. Test selected chemicals and other measures, in vitro and in vivo, to determine potential or inhibitive action against parasite eggs and larvae.

Equine Pirophasmosis

084

Investigator:	W. M. Frerichs	Location:	Animal Parasitology Institute
Start:	May 1963		Agricultural Research Center
Terminate:	February 1979		Beltsville, Maryland 20705

Objectives:

Determine the pathogenesis of babesial infections in equids; study parasite development in arthropod vectors; evaluate potential babesiacidal drugs, study diagnostic methods other than the complement fixation test.

Approach:

Maintain in quarantine Babesia equi carrier horses; evaluate serological tests monthly. Subinoculate susceptible horses for carrier state duration. Improve antigen production and storage. Ascertain tick transmitters of Babesia. Study B. Canis in dogs and B. rodhaini in rodents, and B. microti in hamsters for basic aspects of infections. Determine Babesia ultrastructures by electron microscopy. Ascertain biochemistry of host-parasite relationships in equine pirophasmosis. Evaluate babesiacidal drugs.

Analysis of Costs and Returns to the Breeder-Owner Sectors of the
Maryland Horse Industry

085

Investigator: R. G. Lawrence
Start: May 1970
Terminate: September 1977

Location: University of Maryland
College Park, Maryland 20742

Objectives:

Determine breeder-owner costs and returns relative to recent changes which have occurred in the industry; evaluate alternatives available to the breeder-owner sector.

Approach:

Breeder-owner lists from another research project will be utilized for a mail questionnaire and interview of horsemen to obtain data on such factors as investment, horse breeding relative to other agricultural enterprises, employment, other expenditures, and income by source and activity. Industry changes which have affected activity and return such as changes in structure, state regulation and introduction of new breeds, will be included. Some data collection and analysis will be based on the national economic analysis of racing and breeding underway in order that relevant national data may be incorporated. Analysis will primarily require standard statistical procedures.

Market Analysis of the Maryland Horse Industry

086

Investigator: R. G. Lawrence
Start: April 1970
Terminate: September 1977

Location: University of Maryland
College Park, Maryland 20742

Objectives:

Estimate the size and marketing framework of the Maryland horse industry, the existing and potential market for pleasure horses in Maryland, and the existing potential market for Maryland-bred horses.

Approach:

A two frame survey (list and area) will be utilized to provide information on the demand and supply side of the pleasure horse market and on the existing marketing framework, including channels currently used. The list frame will be utilized for a mail questionnaire and development of a sample for interview; the area frame of 250-300 segments for complete enumeration of sample areas of the state. The latter will provide independent data and check on the results of the list survey. Data collection and analysis of the market for Maryland-bred horses will be based on a national analysis of racing currently underway and will utilize breed association mare and stallion printouts to tabulate horses, and to pick the sample of breeders for interview. Available secondary data will also be utilized in estimating this market.

Investigator: J. R. Lichtenfels Location: Animal Parasitology Institute
Start: July 1974 Agricultural Research Center
Terminate: Indefinite Beltsville, Maryland 20705

Objectives:

Provide basic information on morphology, classification, distribution, and life history; and an identification service; or parasites of medical and veterinary importance.

Approach:

Study experimental and natural populations of closely related species of parasites of horses and zebras to determine differential systematic characters useful in identifying parasites, both whole specimens and sections, found in host tissues. Study intraspecific and interspecific variation in parasites and determine guidelines for distinguishing between them. Study the development and life history of parasites to provide data useful in identifying larval specimens and in establishing classification schemes. Prepare for publication description of new or poorly described species, illustrated differential keys, monographs, reviews, or systematic revisions of groups of parasites.

Zoographic Characteristics of Domestic Animals with Tumors

088

Investigator: W. A. Priester Location: National Institutes of Health
Start: 1974 Bethesda, Maryland 20014
Terminate: Indefinite

Objectives and Approach:

Using data from the 24,000 tumors (550,000 patient-years-at-risk) reported at the Veterinary Medical Data Program through December 1973, provide a reference of the distribution of spontaneous tumors in domestic animals. Search for unusual zoographic distributions of tumors, which may suggest possible clues regarding the etiology of cancer. The patient characteristics to be emphasized are age, breed/species, sex; the tumor characteristics and degree of malignancy, site and histogenic type. Only the bovine, equine, feline and canine species had a sufficient number of tumors reported to be of value in the analytic studies. Current studies include intranasal tumors, multiple primary tumors, prostatic tumors and mammary tumors.

Michigan

Effects of Meclofenamic Acid on Synovial Fluid from Arthritic Joints of Horses

089

Investigator: G. H. Conner
Start: August 1971
Terminate: Indefinite

Location: College of Veterinary Medicine
Michigan State University
East Lansing, Michigan 48823

Objective:

Investigate and evaluate the clinical efficacy of newer drugs proposed for use in animals.

Approach:

Selected drugs, as they are produced by industry, will be studied for toxicity and effectiveness. Two groups of products in which we have interest are drugs for controlling the estrous cycle and drugs used for anesthetics or tranquilizers.

Use of CI-744 As An Inductional Agent For Equine Anesthesia

090

Investigator: G. H. Conner
Start: March 1976
Terminate: Indefinite

Location: College of Veterinary Medicine
Michigan State University
East Lansing, Michigan 48823

Objective and Approach: Not provided

Hormonal Control of Ovulation in Animals

091

Investigator: W. R. Dukelow
Start: January 1958
Terminate: June 1975

Location: Michigan State University
East Lansing, Michigan 48823

Objectives:

Develop a technique for controlling ovulation in animals. Use this to determine capacitation and fertilization time and allow a high rate of implantation and minimum of embryonic death.

Approach:

Initial efforts will involve adaptation of laparoscopic techniques to farm animals for visualizing ovulation. Then, estrus will be synchronized with progestins and various regimes of FSH and HCG employed to induce ovulation. Blood levels of progesterone, estrogen and gonadotropins will be determined in normal and induced animals. These samples will be taken throughout estrus and to the stage of implantation. Initial work will involve sheep, goats, and horses with later work in cattle and swine. After determination of the time of ovulation, animals will be mated and by this means the time requirement for capacitation can be determined.

Lead Toxicity in Horses

092

Investigator: K. F. Gallagher Location: College of Veterinary Medicine
Start: June 1973 Michigan State University
Terminate: December 1975 East Lansing, Michigan 48823

Objective and Approach: Not provided

Intravenous Alimentation for the Equine Surgical Patient

093

Investigator: L. A. Gideon Location: College of Veterinary Medicine
Start: September 1975 Michigan State University
Terminate: Indefinite East Lansing, Michigan 48823

Objective and Approach: Not provided

Staple Suturing Techniques for Equine Abdominal Surgery

094

Investigator: L. A. Gideon Location: College of Veterinary Medicine
Start: June 1975 Michigan State University
Terminate: Indefinite East Lansing, Michigan 48823

Objective and Approach: Not provided

Ovulation Control in Mares

095

Investigator: W. D. Oxender Location: College of Veterinary Medicine
Start: October 1974 Michigan State University
Terminate: September 1976 East Lansing, Michigan 48823

Objectives:

Develop methods of ovulation control in mares and using these methods to predict the time of ovulation in mares.

Approach:

The use of photoperiod stimulation for anestrus mares to initiate estrous cycles is being studied to determine what photoperiod is most efficient. In addition, exogenous hormones are being tested in mares for their ability to control ovulation to such a degree of accuracy that the day of ovulation can be pre-planned for breeding purposes.

Development of Collateral Ventilation

096

Investigator: N. E. Robinson
Start: February 1975
Terminate: January 1977

Location: College of Veterinary Medicine
Michigan State University
East Lansing, Michigan 48823

Objectives:

To investigate collateral ventilation between adjacent lung lobules in the dog, pig and horse. The study will determine the effects of lung volume, lung volume history, acute airway obstruction, chronic airway obstruction, and animals age on collateral ventilation in these three species.

Circulation of the Forefoot of the Horse and Relationship to the Etiology of Laminitis

097

Investigator: N. E. Robinson
Start: October 1974
Terminate: October 1976

Location: College of Veterinary Medicine
Michigan State University
East Lansing, Michigan 48823

Objective:

Investigate the effects of vasoactive agents, electrolytes, and blood osmolality on the pressure flow relationships and on the permeability of the equine digital vasculature in normal ponies and ponies with acute alimentary laminitis.

Partitioning of Airway Resistance in the Equine Upper and Lower Respiratory Tract

098

Investigator: N. E. Robinson
Start: January 1974
Terminate: Indefinite

Location: College of Veterinary Medicine
Michigan State University
East Lansing, Michigan 48823

Objectives:

To determine the pressure flow relationships of the equine respiratory tract and determine the sites of greatest airway resistance in normal horses and horses with respiratory disease.

Nutrition and Physiology of the Horse

099

Investigator: D. E. Ullrey
Start: May 1972
Terminate: May 1977

Location: College of Veterinary Medicine
Michigan State University
East Lansing, Michigan 48823

Objectives:

Develop pelleted diets which will satisfactorily nourish horses of all ages and productive states. Develop systems of horse feeding and management which can be easily and safely accomplished by inexperienced horse owners.

Approach:

Digestibility of a pelleted diet developed at MSU will be estimated by total collection and chromic oxide ratio techniques. When used as the sole diet, the energy available for support of different amounts of muscular work will be estimated by forcing horses to travel measured distances at measured speeds. Changes in body weight and composition will be measured.

Minnesota

Chronic Respiratory Diseases in the Equine Using Bronchial Lavage Sampling Techniques 100

Investigator:	R. H. Busch	Location:	College of Veterinary Medicine
Start:	1975		University of Minnesota
Terminate:	Indefinite		St. Paul, Minnesota 55108

Objective and Approach: Not provided

Comparative Biochemistry of Milks of Various Mammals, Including Horses 101

Investigator:	R. Jenness	Location:	Agricultural Experiment Sta.
Start:	1974		University of Minnesota
Terminate:	Indefinite		St. Paul, Minnesota 55101

Objectives:

Elucidate the evolution of lactation in the mammals by determining the extent of quantitative and qualitative variability in the composition and properties of the milks of various species. Elucidate species differences in biosynthetic pathways in the mammary gland.

Approach:

Milk will be secured from animals of as many species as possible in the wild, in zoos and in the laboratory. Quantitative analyses will be made for the principal constituents: proteins, lipids, carbohydrates, minerals, and citrate. Proteins will be characterized by electrophoretic, enzymatic, and immunological methods. Homologous proteins of various species and genetic variants within species will be isolated for characterization and particularly for determination of amino acid composition and sequence. The caseinate micelles will be analyzed for size distribution and for mineral elements. The lipids will be characterized by thin layer chromatography, fatty acid analyses and physical characteristics of the fat globules. Especial attention will be paid to characterization of carbohydrates other than lactose and of inositols and sialic acids. Enzymatic processes whereby these compounds are synthesized in different species will be elucidated by both in vivo and in vitro studies. The biochemical basis for the implications of the large species differences in citrate content of milk will be investigated.

Primary Immunodeficiency Disease in Foals

102

Investigator: J. J. McClure
Start: 1975
Terminate: Indefinite

Location: College of Veterinary Medicine
University of Minnesota
St. Paul, Minnesota 55108

Objective and Approach: Not provided

Coagulation Profiles in Horses with Experimentally Induced Acute Alimentary Laminitis

103

Investigator: J. R. McClure
Start: 1975
Terminate: Indefinite

Location: College of Veterinary Medicine
University of Minnesota
St. Paul, Minnesota 55108

Objective and Approach: Not provided

Mississippi

Increasing Conception Rate and Foal Development in Quarter Horses

104

Investigator: L. H. Boyd
Start: July 1973
Terminate: June 1978

Location: Mississippi State University
State College, Mississippi 39762

Objectives:

Study the effect of an anthelmintic administered postpartum and the rebreeding of mares, the effects of rectal temperature on length of estrus, and the effects of growth stimulants on the development of foals.

Approach:

Fourteen broodmares will be paired based on expected foaling date. Seven are to receive anthelmintic three to five days postpartum. Rectal temperature will be taken twice daily for the duration of estrus. Weight increase and skeletal measurements will be made on foals.

Missouri

Drug Equine Research

105

Investigator: H. E. Garner
Start: September 1975
Terminate: Indefinite

Location: College of Veterinary Medicine
University of Missouri
Columbia, Missouri 65201

Objective:

Study pharmacological effects of a variety of drugs on the equine.

Endocrine and Cardiovascular Dynamics of Laminitis and Shock

106

Investigator: H. E. Garner Location: College of Veterinary Medicine
Start: October 1973 University of Missouri
Terminate: Indefinite Columbia, Missouri 65201

Objective:

Delineate the cardiovascular and endocrine changes common to intestinal obstruction and laminitis in equines.

Equine Lameness

107

Investigator: H. E. Garner Location: College of Veterinary Medicine
Start: April 1974 University of Missouri
Terminate: Indefinite Columbia, Missouri 65201

Objective:

Study the effect of certain drugs on equine lameness.

Pharmacologic Characterization of Acute Equine Laminitis

108

Investigator: H. E. Garner Location: College of Veterinary Medicine
Start: July 1975 University of Missouri
Terminate: Indefinite Columbia, Missouri 65201

Objectives:

Characterize the alpha and beta adrenergic mediated changes associated with acute laminitis and quantify the contribution of pain to the cardiovascular alterations.

Equine Epistaxis Research

109

Investigator: J. H. Johnson Location: College of Veterinary Medicine
Start: November 1973 University of Missouri
Terminate: Indefinite Columbia, Missouri 65201

Objective:

Study blood pressures and necropsy findings in equines with epistaxis (nosebleed)

Effects of Furosemide on Extrarenal Hemodynamics in Horses

110

Investigator: J. H. Johnson Location: College of Veterinary Medicine
Start: July 1975 University of Missouri
Terminate: Indefinite Columbia, Missouri 65201

Objectives:

Measure the effects of furosemide on pulmonary artery pressure, aortic pressure and cardiac output and measure changes in plasma, urine electrolytes and creatinine due to intravenous administration of furosemide.

Nevada

Adaptation by Animals in Desert and Mountain

111

Investigator: D. B. Dill
Start: 1974
Terminate: Indefinite

Location: Desert Research Institute
University of Nevada
Reno, Nevada 89507

Objective:

Investigate the responses of man and animals to environmental stresses.

Approach:

Individual responses of man and burro to exercise in desert heat including variation in the patterns of electrolyte losses in sweat, capacity for temperature regulation, and degree of acclimatization. An attempt will be made to apply the principles developed by L. J. Henderson in describing the physico-chemical properties of blood to a description of the interplay of weather conditions that determine climatic strain. Describe the interdependence of internal factors involved in the readjustments of intracellular and extracellular water and dissolved substances to losses of water and electrolytes in sweat. A similar approach will be made to a better understanding of persistent changes in acid-base balance in the oxygen lack of high altitude. Study desert and mountain rodents will continue. Exploratory studies will be made of the roles of the integument in adaptation with particular attention to water and fat content. With the help of visiting scientists, the behavioral responses of lizards and insects to the desert environment will be explored.

New Jersey

Effects of Vitamin E on Fatigue in Horses

112

Investigator: G. W. Vandernoot
Start: February 1975
Terminate: December 1978

Location: Department of Animal Science
Rutgers University
New Brunswick, New Jersey 08903

Objective:

Establish quantitatively the effects of vitamin E diet supplementation on minimizing fatigue, stress, and increasing endurance during physical activity in the horse.

Approach:

Feed 500 I.U. of vitamin E daily for four weeks, then increase to 2,000 units. Horses will be worked at several speeds. Heart and respiration rates, blood alpha-tocopherol, lactate, hemoglobin and packed cell volume will be compared in treated and control horses.

Sulfate Aerosols in Pulmonary Function, Particle Deposition,
and Bronchial Clearance in Donkeys

113

Investigator: R. E. Albert
 Start: June 1975
 Terminate: May 1976

Location: Inst. of Environmental Med.
 NYU Medical Center
 New York, New York 10016

Objectives:

To determine the effects of sulfate aerosols on airway resistance and compliance, regional particle deposition, and rates of bronchial clearance in donkeys, and the effects of aerosol hygroscopicity on regional deposition.

Approach:

Expose animals to each sulfate aerosol at various particle sizes and concentrations. Characterize changes they produce in pulmonary function. Correlate pulmonary function changes with changes in regional particle deposition by adding gamma radiolabel to the droplets and measuring deposition efficiency with external scintillation detectors mounted on a counterweighted backpack strapped to the animal. For measurements of the effects of sulfate aerosols on bronchial clearance dynamics, animals will first be exposed to radiolabelled microspheres which are chemically and physiologically inert. Serial retention measurements will then be made with the backpack detectors throughout the bronchial clearance interval.

Immunochemical Studies on Equine Antibodies

114

Investigator: P. Z. Allen
 Start: June 1975
 Terminate: November 1977

Location: School of Medicine and
 Dentistry
 University of Rochester
 Rochester, New York 14642

Objectives and Approach:

Isolate, purify and characterize immunoglobulins from various equine species. Antibodies have been produced in the horse to human IgG, to type-specific pneumococcal capsular polysaccharides and to donkey IgG immunoglobulin. Chemical, physicochemical and immunological studies of these horse immunoglobulins is being carried out for comparison with other equine species.

Enhancement of Articular Repair in Horse, Dog and Rabbit

115

Investigator: B. E. Baker
 Start: 1973
 Terminate: Indefinite

Location: Upstate Medical Center
 State University of New York
 Syracuse, New York 13120

Objective and Approach: Not Provided

Equine Infectious Anemia

116

Investigator: L. Coggins
Start: April 1975
Terminate: March 1976

Location: College of Veterinary Medicine
Cornell University
Ithaca, New York 14850

Objectives:

Develop an accurate, quick and inexpensive serological or other test or diagnostic procedure for the detection of Equine Infectious Anemia virus in horses. Develop a biological agent which would produce a degree of protection or immunity against this virus in a healthy horse.

Equine Infectious Disease

117

Investigator: L. Coggins
Start: January 1975
Terminate: December 1976

Location: College of Veterinary Medicine
Cornell University
Ithaca, New York 14850

Objectives:

Study the prevalence of Equine Infectious Anemia in horses and the mechanisms of transmission of EIA virus.

Equine Respiratory Diseases

118

Investigator: L. Coggins
Start: April 1975
Terminate: March 1976

Location: College of Veterinary Medicine
Cornell University
Ithaca, New York 14850

Objectives and Approach:

Investigate etiological agents of respiratory infections of the horse. Develop diagnostic tests, means of prevention, and vaccines for immunization.

Preparedness for Laboratory Assistance in Diagnosis of Foreign Animal Diseases

119

Investigator: A. H. Dardiri
Start: 1974
Terminate: Indefinite

Location: Animal Disease Center, USDA
Greenport, New York 11944

Objective:

On a continual basis, develop versatility and capability among research personnel to diagnose 32 or more foreign animal diseases, in order to render assistance in the characterization of foreign animal diseases and their differentiation from clinically similar diseases enzootic in the United States. Also, produce potent reference biologicals against these diseases.

Approach:

Train personnel in utilization of pathological, cytological, immunological, biochemical and physical methods and techniques for arriving at diagnosis of the disease, its identification and its reaction in the susceptible host. Production, standardization, storage and maintenance of quantities of specific antigens and antisera. Preparation of pathological specimens and illustrative material. Periodic assay of diagnostic materials developed and determination of viability and virulence of stored reagents.

Nutrient Requirements of the Light Horse

120

Investigator: H. F. Hintz
Start: July 1970
Terminate: July 1975

Location: Cornell University
Ithaca, New York 14850

Objectives:

Study factors affecting nutritional requirements of horses and attempt to better define these requirements. Emphasis will be placed on requirements of calcium, phosphorus and protein because of their relationship to skeletal development. The availability of calcium and phosphorus sources will be studied.

Approach:

Calcium and phosphorus requirements and metabolism will be studied with combined balance and kinetic trials with the use of radioisotopes. Data from these trials will include total mineral retained, endogenous or obligatory losses in urine and feces which can be used to estimate maintenance requirements, estimates of bone accretion and resorption rates and true availability of calcium and phosphorus. Calcium and phosphorus requirements for growth are being studied in feeding trials with young foals. Protein and amino acid requirements will be estimated with feeding trials and nitrogen balance trials. The contributions of the microflora of the lower gut to the nitrogen pool will be estimated in ponies fitted with re-entrant intestinal cannulas and catheterized portal veins.

An Investigation of Equine Dominance and Maternal Behavior

121

Investigator: K. A. Houpt
Start: October 1975
Terminate: September 1976

Location: College of Veterinary Medicine
Cornell University
Ithaca, New York 14853

Objectives:

Elucidate the determinates of dominance in horses, especially the influences of size, weight, age and sex on dominance. Investigate the maternal - foal bond and the relative importance of visual and auditory recognition of the mare by the foal and the foal by the mare.

Approach:

Dominance will be determined by pairing two horses in a 15 minute test. One bucket of food will be present. The horse which spends the most time eating will be considered the dominant animal. All aggressive acts, threats, kicks and bites will also be recorded. The age, height, weight and/or chest girth of all the horses will be determined and the correlation between these factors and the horse's rank in the dominance hierarchy will be calculated. Numerous ponies and a herd of ten thoroughbred brood mares will be studied. The foals will also be tested to determine the influence of the dam's position in the hierarchy on that of the foal.

The mare-foal bond will be studied by recording the separation calls of each mare and foal. The calls will then be played back and the reaction of each mare and foal to its own dam's (or foal's) voice will be compared with its reaction to another horse's voice. The influence of visual cues in recognition of the mare by the foal will be determined by recording the time that it takes a foal to approach his dam and begin suckling in preference to another mare of a different coat color than the dam, in preference to another mare of the same coat color and when both mares are "disguised" with blankets, hoods and leg bandages.

Biology and Control of Ectoparasites and Flies Affecting Livestock and Poultry

122

Investigator: J. G. Matthysse
Start: September 1969
Terminate: June 1976

Location: Department of Entomology
Cornell University
Ithaca, New York 14850

Objectives:

Develop most effective, least expensive, and least contaminating materials and methods for controlling arthropod pests of livestock and poultry.

Approach:

Acquire basic information on the biology of lice, mites, ticks, grubs, house-flies, face flies and blood sucking flies that parasitize and annoy horses, cattle, sheep, goats, swine and poultry.

Equine Drug Research Program

123

Investigator: G. Maylin
Start: April 1975
Terminate: March 1976

Location: College of Veterinary Medicine
State University of New York
Ithaca, New York 14850

Objectives and Approach:

Investigate methods for detection of drugs that might be used as stimulants or depressants in race horses. Study the metabolism, modes of action, and excretion of these drugs.

Oxygen Transport of Horse Hemoglobins with Modified Hemes

124

Investigator: J. K. Moffat Location: Cornell University
Start: 1975 Ithaca, New York 14853
Terminate: Indefinite

Objectives and Approach: Not provided

Taxonomic, Biological and Distributional Studies on Horse Flies
and Deer Flies

125

Investigator: L. L. Pechuman Location: Department of Entomology
Start: April 1970 Cornell University
Terminate: March 1975 Ithaca, New York 14850

Objectives:

Use morphological and behavioral characters of adult and immature Tabanidae to characterize relationships among species. Establish distributional patterns of the various species.

Approach:

Adult Tabanidae will be collected utilizing various methods. Immature forms will be collected by screening mud in breeding areas. Adults will be studied in the laboratory. Ecological and behavioral observations will be recorded and evaluated.

Equine Research

126

Investigator: H. F. Schryver Location: College of Veterinary Medicine
Start: April 1975 Cornell University
Terminate: March 1976 Ithaca, New York 14850

Objective and Approach:

Study bone and joint diseases of the horse. The major projects are in skeletal physiology and metabolism, mineral metabolism and nutrition, clinical and surgical research, and in digestive physiology of the horse.

Conformation Studies on Modified Hemoglobins of the Horse

127

Investigator: S. R. Simon Location: School of Arts
Start: September 1971 State University of New York
Terminate: August 1976 Stony Brook, New York 11790

Objective:

Characterize cooperative interactions, changes in values of linked functions, and conformational rearrangement normally associated with binding and release of oxygen to hemoglobin.

Approach:

Modify the native hemoglobin molecule with bifunctional reagents which freeze horse hemoglobin into a conformation identical to that of the normal oxy-protein, even when deoxygenated. The induced conformational constraint has been demonstrated in crystals by X-ray diffraction methods, and in solution by circular dichroism and temperature-jump methods. We propose a series of additional modification studies to establish the mechanism whereby the normal ligand-linked conformational changes are eliminated. The properties of the altered proteins will be related to those of the native hemoglobin molecule to identify additional interactions among specific amino acids which are critical for normal physiological function.

Somatic Cell Approach in Genetic Analysis of Equines, Mice and Hamsters

128

Investigator: M. Siniscalco**Location:** Genetic Research Center**Start:** 1972Albert Einstein College of
Medicine**Terminate:** Indefinite

Bronx, New York 10461

Objective and Approach: Not ProvidedComparative Studies of Large Intestinal Function

129

Investigator: C. E. Stevens**Location:** College of Veterinary Medicine**Start:** May 1975

Cornell University

Terminate: April 1976

Ithaca, New York 14850

Objectives and Approach:

The stomach of many mammals and the large intestine of most mammals maintain indigenous flora which appear to function in a manner quite similar to those of the ruminant forestomach, i.e. conversion of both soluble and insoluble carbohydrate into volatile fatty acids (VFA), synthesis of microbial protein from crude protein or non-protein nitrogenous sources and synthesis of B vitamins. This would have considerable nutritional significance if the VFA, proteins and vitamins can be assimilated by the host and studies conducted in this laboratory present good evidence that significant amounts of VFA can be produced within and absorbed from the large intestine of the pony and pig. It also appears that significant quantities of microbial protein can be synthesized, digested and absorbed in some form by the large intestine of the pony. However, in addition to its nutritional importance, the production and absorption of VFA in the large intestine of the above species also appears to be intimately associated with the secretion and absorption of other electrolytes and water. This indication that the VFA also play a major role in the other functions of the large intestine is supported by evidence suggesting that excessive production of VFA in the large intestine can inhibit its motor activity and initiate diarrhea. This project would examine the general characteristics of digesta passage, VFA production and absorption and nitrogen

utilization in the large intestine of a variety of species. It would also more closely examine the characteristics of large intestinal secretory and absorptive mechanisms by perfusion techniques and in vitro studies of isolated mucosa, to determine the mechanisms of and interrelationship between transport of inorganic ions, VFA and water.

North Carolina

Genetic Mechanisms of Adaptation in Cutaneous Bacteria

130

Investigator:	W. E. Kloos	Location:	Agricultural Experiment Station
Start:	1974		University of North Carolina
Terminate:	Indefinite		Raleigh, North Carolina 27600

Objective:

Describe and characterize cutaneous populations of micrococci and staphylococci from humans, and determine the biochemical and genetic basis of their adaptation mechanisms.

Approach:

Preliminary ecological and taxonomic information will be collected on the sizes, distribution, duration of colonization, and associations of clonal populations of cutaneous micrococci and staphylococci. Genetic biochemical studies will involve looking at extra-chromosomal and chromosomal genes which are associated with adaptation. Natural studies will be followed by chemostat experiments to determine the adaptive values of different genotypes under different environmental conditions.

Mechanisms of Pesticide Action of Horse Serum Cholinesterase

131

Investigator:	A. R. Main	Location:	Department of Entomology
Start:	1975		North Carolina State University
Terminate:	Indefinite		Raleigh, North Carolina 27600

Objective and Approach: Not provided

Ohio

Non-invasive Measurement of Airways Resistance in Human, Dog, Swine and Horse

132

Investigator:	R. L. Pimmel	Location:	Ohio State University
Start:	1974		Columbus, Ohio 43210
Terminate:	Indefinite		

Objective and Approach: Not Provided

Wall Shear Stresses in Equine Coronary Vessels

133

Investigator: C. R. Smith
Start: 1973
Terminate: Indefinite

Location: Ohio State University
Columbus, Ohio 43210

Objective and Approach: Not provided

Cecal Digestion in Equines

134

Investigator: W. J. Tyznik
Start: June 1967
Terminate: June 1977

Location: Department of Animal Science
Ohio Agricultural Research and
Development Center
Wooster, Ohio 44691

Objective:

Determine the rate of feed passage in cecectomized and intact equines and determine fiber utilization, protein digestion and microbial populations in the cecum.

Approach:

Four cecectomized and four intact male Shetland ponies will be used in a digestion experiment to study four rations in a paired latin square design. Three levels of corn cobs and one of alfalfa will be investigated. Rations will be calculated and fed to be iso-nitrogenous and iso-caloric. Feric oxide will be used as a marker to indicate rate of passage.

Structure and Release Mode of Mature Horse Sperm Chromosomes

135

Investigator: T. E. Wagner
Start: 1974
Terminate: Indefinite

Location: Department of Chemistry
Ohio University
Athens, Ohio 45701

Objective and Approach: Not Provided

Oregon

Ration Alternatives for Horses

136

Investigator: D. Holtan
Start: July 1973
Terminate: June 1978

Location: Oregon State University
Corvallis, Oregon 97331

Objective:

To evaluate grass straw as an economical alternative roughage source in maintenance rations for mature horses.

Approach:

General feeding trials comparing body weights, digestibility, and consumption of grass straw or hay based rations. Standard digestibility trials with various grass straw and legumehay concentrate and non-protein nitrogen sources. Observation trials for grass straw variety preference and digestibility trials when coprophagy is and is not prevented.

Biological Protection of Livestock Against Internal Parasites

137

Investigator: T. P. Kistner**Location:** Oregon State University**Start:** July 1959

Corvallis, Oregon 97331

Terminate: September 1980**Objective:**

Protect livestock from internal parasites by use of methods antagonistic to parasites.

Approach:

Investigations will be made of seasonal and annual fluctuations in gastrointestinal and lungworm nematode and liver fluke infections in native sheep and cattle. The purpose is to identify critical periods so that preventive measures can be devised and instituted in advance of major outbreaks of parasitic diseases. *Sarcocystis* sp. (Protozoa:Sporozoa) found in mule deer will be investigated and the pathogenicity of this parasite determined for deer, cattle and sheep. Studies will be conducted in cooperation with commercial companies in the development of parasiticides as an interim measure for controlling parasite induced losses. Studies will include horses.

Nutritional and Biomedical Interactions of Selenium

138

Investigator: J. E. Oldfield**Location:** Oregon State University**Start:** July 1972

Corvallis, Oregon 97331

Terminate: June 1977**Objectives:**

Determine effects of natural and synthetic substances on selenium metabolism; investigate selenium deficiency in species other than cattle and sheep; study effects of selenium on reproduction anticarcinogenicity and vascularization; investigate synthesis of selenium-binding proteins; identify factors responsible for calcification in white muscle disease; and compare muscle lysosomes from normal and selenium deficient animals.

Approach:

Selenium deficiency will be induced in lambs by feeding pregnant ewes forage imported from selenium deficient soil areas. Blood and other tissues in normal and deficient animals will be examined. Effects of organic and inorganic constituents of the feed on selenium status will be examined. Similar studies will be done on laboratory animals and other species, using torula diets to induce deficiency.

Investigator: S. P. Snyder
Start: July 1973
Terminate: June 1976

Location: Oregon State University
Corvallis, Oregon 97331

Objectives:

Collect and process Tansy Ragwort (Senecio jacobaea) for formulation in feeds for animal toxicity studies. Study dose-related effects of ragwort alkaloids to determine maximum levels that can be fed before irreversible damage. Study sequential development of the disease. Study differences between sheep and cattle to pyrrolizidine alkaloids.

Approach:

Using mixtures of ragwort and hay feeding trials for dose-relatedness can be undertaken. Sequential development of the disease can be followed by liver biopsy to examine histopathological and ultrastructural alterations in hepatic tissue. Tests will be run to determine sequential development of blood enzymatic aberrations as they relate to liver cell destruction and loss of liver function. It is hoped a battery of enzyme tests can be developed to determine the point of irreversibility and to arrive at criteria for animal salvage before clinical evidence of disease ensues. Studies will include horses.

Pennsylvania

Utilization of Protein by Equine

140

Investigator: T. V. Hershberger
Start: 1974
Terminate: Indefinite

Location: Agricultural Experiment Station
Pennsylvania State University
University Park, Pennsylvania
16802

Objective:

Evaluate the effect of protein quality on nitrogen retention by equine as influenced by ration density.

Approach:

Mature, cecal-cannulated horses in metabolism stalls will be fed semi-synthetic rations formulated to meet all NRC requirements except protein. Crude protein supplements will be supplied orally or intracecally to meet NRC requirements. The nonprotein portion of the ration will be pelleted and will be either high in cellulose (low density) or high in starch (high density). Digestible energy, metabolizable energy and nitrogen balance will be determined on each of twelve rations. Rate of absorption of amino acids from the gut will be estimated by determining flow and concentration of amino acids in the portal vein at various times after feeding.

Studies on Leukemia in the Horse

141

Investigator: R. R. Marshak Location: School of Veterinary Medicine
Start: 1972 University of Pennsylvania
Terminate: 1975 Philadelphia, Pennsylvania 19104

Objective:

Determine if equine leukemia is induced by a virus. If this proves to be the case, characterize the virus and define virus-tumor and host-tumor relationships.

Pulmonary Insufficiency During Anesthesia in Human, Dog, Horse and Sheep

142

Investigator: R. E. Marshall Location: Department of Anesthesia
Start: 1967 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19104

Objective and Approach: Not Provided

Pathophysiology of Chronic Diarrhea in the Horse

143

Investigator: A. M. Merritt Location: School of Veterinary Medicine
Start: September 1972 University of Pennsylvania
Terminate: June 1975 Philadelphia, Pennsylvania 19104

Objective:

Define the location and nature of intestinal malfunction in the horse which result in the chronic diarrhea syndrome.

Bio-Mechanical Modeling of Lameness

144

Investigator: J. R. Rooney Location: School of Medicine
Start: 1974 University of Pennsylvania
Terminate: November 1975 Philadelphia, Pennsylvania 19104

Objective:

Study the mechanical origins of lameness on racehorses, including bowed tendons, broken knees, split pastern and cannon bones, and traumatic arthrosis.

Approach:

Acquire and analyze data existing on bio-mechanical model. Determine bone and joint forces and study factors affecting bone, joint, and muscle forces. A measurement technique will be used consisting of a triangular force plate buried beneath a track, together with a simultaneous cinematographic recording.

South Carolina

Nitrogen Utilization in the Equine

145

Investigator: L. W. Hudson

Location: Department of Animal Science
Clemson University

Start: July 1975

Terminate: June 1978

Clemson, South Carolina 29631

Objective:

Gain a better understanding of nitrogen utilization of the equine by determining the effects of supplemental amino acids, especially lysine and methionine, on rations supplemented with soybean oil meal.

Approach:

There will be a series of digestion trials using purified rations and semi-purified rations to test the hypothesis that higher quality of amino acids result in improved nitrogen utilization. Parameters to be measured are nutrient digestibility, cecal levels of ammonia and dry matter as well as plasma ammonia concentrations.

Distribution and Biology of Parasites in Domestic Animals

146

Investigator: G. P. Noblet

Location: Department of Entomology &
Economic Zoology

Start: January 1975

Terminate: June 1979

Clemson University

Clemson, South Carolina 29631

Objectives:

Determine the prevalence and geographic distribution of intestinal helminths and coccidia in cattle and horses in South Carolina and relate the level of parasitism to the overall nutritional state of the host, management practices and location of hosts with reference to presence of reservoir hosts. Study the biology of *Haemoproteus* and *Leucocytozoon* in their avian hosts.

Approach:

Fecal samples from cattle and horses will be examined microscopically for helminth eggs and protozoan cysts. Samples will be analysed quantitatively by a modified McMaster technique. Blood from avian hosts will be examined for both protozoa and microfilariae. Quantitative determinations will be made from hemacytometer counts of blood diluted with Becton-Dickinson Unopette containers.

Mycotoxins and Moldy Food Diseases

Investigator:	B. J. Wilson	Location:	School of Medicine
Start:	1965		Vanderbilt University
Terminate:	1976		Nashville, Tennessee 37203

Objective:

Characterize Fungus toxins and diseases associated with moldy food and feed.

Approach:

Efforts will be made to define the toxic principle of corn infected with Fusarium moniliforme that causes leukoencephalomalacia in equine animals. The recently discovered metabolite known as "moniliformin" will be synthesized and administered to horses or donkeys in order to ascertain any possible relationship of this substance to the encephalomalacia. Study toxic stress metabolites in mechanism of pulmonary toxicity exhibited by 4-ipomeanol and its activation by cytochrome dependent-mixed function oxygenase system and the covalent binding to subcellular material. Also studies will be made of the histopathological features of the resultant lung damage as revealed by electron microscopy. Aspects of the biosynthetic routes for both hepatotoxic and lung-toxic metabolites will continue to be studied. Enzyme systems responsible for interconversions among metabolites will be isolated and characterized. Develop quantitative analytical methods for the pulmonary toxins and use them in measurement of toxin levels in marketed sweet potatoes.

Diseases and Therapeutics of Large Animals

148

Investigator: M. R. Calliham Location: College of Veterinary Medicine
 Start: June 1973 Texas A & M University
 Terminate: August 1975 College Station, Texas 77843

Objective:

Establish a general project and an account for applied research in large animal medicine and surgery to be funded by private and public grants.

Approach:

Disease problems will be investigated from one or more of the following stand-points: etiology, diagnostics, prevention, surgical techniques and therapeutic regimens and agents.

Mare Immunopregnancy Test for Detecting Early Embryonic Mortality

149

Investigator: D. Hightower Location: College of Veterinary Medicine
 Start: August 1969 Texas A & M University
 Terminate: January 1999 College Station, Texas 77843

Objectives:

Determine the earliest stage of pregnancy in equine that a serum immunopregnancy test can be reliably used; establish by titration the relative units of gonadotropins in pregnant mare serum at various stages of gestation; correlate the relationship of gonadotropin levels at various stages of gestation to subsequent embryonic mortality and abortion; correlate results of the immuno test, bioassay, and rectal palpation as to reliability in determining early pregnancy and early embryonic mortality.

Approach:

Blood serum from pregnant mares will be tested for relative gonadotropin activity using a mare immunopregnancy test (hemagglutination inhibition). Results will be correlated with incidence of early embryonic mortality and/or abortion. Time of pregnancies will be determined. Results will be compared to ascertain method most reliable in the detection of embryonic mortality.

Reservoir Potential of Domestic Animals for Encephalomyelitis

150

Investigator: S. McConnell Location: Texas A & M University
 Start: June 1973 College Station, Texas 77843
 Terminate: October 1975

Objectives:

Determine the effects of equine virulent Venezuelan Equine Encephalomyelitis virus on domestic animals other than horses to clarify their roles in the epizootiology of the disease. Determine the blood-sucking insects most commonly attracted to these hosts.

Approach:

Artificially infect cattle, pigs, goats, sheep, dogs and chickens with VEE virus and follow clinical serologic and virologic responses. Devise new hematophagous insect trapping and baiting methods, determine host-biting preferences and establish colonies of selected species for transmission studies. Using these data, attempt to transmit the virus from selected hosts via selected mosquitoes to horses.

Diagnosis of Equine Infectious Anemia

151

Investigator: R. W. Moore

Location: Texas A&M University

Start: July 1967

College Station, Texas 77843

Terminate: January 1979

Objectives:

Improve and evaluate serologic tests for the diagnosis of equine infectious anemia. Develop method of separation and purification of the causative virus. Study the immune response in affected horses.

Approach:

The research is to include development of methods for diagnosis and characterization of the virus. The evolution of diagnostic procedures will include liver biopsy, sideroleukocyte test, serum protein determination, complement fixation test, hemagglutination test, precipitin test, and virus isolation. Several strains of the virus will be used in the studies. Infected horses in large numbers will be utilized in the studies.

Slow Virus Infection Models--Equine Anemia and Scrapie

152

Investigator: R. W. Moore

Location: Texas A&M University

Start: January 1972

College Station, Texas 77843

Terminate: March 1975

Objectives:

Study the chemical, physical, serologic and cell culture-virus interaction of the viral agents causing scrapie and equine infectious anemia. Study the virus-host interaction in attempts to determine the nature of the long term viremia in EIA and the chronicity of the two diseases.

Approach:

Studies will include the use of continuous passage horse leucocyte cultures which are highly susceptible to EIA virus. A nutritional study of these cells will be done to attempt to find the factor or factors in fresh sheep serum that are required to maintain this culture. The effect of chemical agents and antigenic relationships will be studied. Serum neutralization studies will be done on 15 infected horses. Biochemical studies will be done on the viron and a study of the pathogenesis of the disease will be studied using fluorescent antibody against the virus, gamma globulin and on abnormal protein or complex reported previously.

Investigator: J. K. Olson
Start: February 1972
Terminate: June 1975

Location: Texas A & M University
College Station, Texas 77843

Objectives:

Determine species of known or potential arbovirus vectors and vertebrate hosts present in selected field sites in Texas and northern Mexico. Investigate population dynamics of potential vectors and vertebrate hosts of arbovirus as they relate to the transmission cycles of viruses. Determine the incidence of viruses in populations of blood-sucking arthropods and vertebrates at each geographic site. Determine ability or potential for selected vector-host associations to maintain viruses.

Approach:

Use available sampling techniques to determine species composition and maintain data on a seasonal and annual basis. Determine seasonal and annual fluctuations in population density and distribution for each life stage. Perform arthropod host preference studies in the laboratory and correlate results with those of field experiments. Screen arthropod and vertebrate blood samples collected at each site for arboviruses using appropriate isolation and serological testing methods. Determine the vector-host associations which have the greatest potential for maintaining virus cycles. Perform experimental transmission studies to support these observations.

Feeding the Immature Horse

154

Investigator: G. Potter
Start: April 1971
Terminate: August 1975

Location: Texas A & M University
College Station, Texas 77843

Objectives:

Characterize growth of the equine. Determine protein, amino acid, energy and mineral requirements for growth of the equine. Determine efficacy and safety of a variety of feedstuffs in rations for the equine. Evaluate effects of anabolic drugs on growth of equine.

Approach:

Make feeding and growth studies, metabolic balance trials, body measurements and x-rays, blood and urine analyses, and studies utilizing cannulation of the digestive tract.

Musculo-Skeletal Abnormalities of Animals

155

Investigator: J. L. Shupe
 Start: July 1972
 Terminate: June 1977

Location: Agricultural Experiment Station
 Utah State University
 Logan, Utah 84322

Objective:

Determine genetic nutritional and biochemical mechanisms that result in abnormal skeletal conditions including chondrodysplasia.

Approach:

Pedigree information on affected horses will be compiled and selected matings made to study mode of inheritance. Affected animals will be monitored and examined at appropriate stages of development for analysis of lesions. Method of analysis will include chemistry, histology, and radiography. Biochemistry, physiology and mineral homeostasis (including blood) will also be included.

Washington

Equine Immunology and Infectious Diseases

156

Investigator: T. B. Crawford
 Start: April 1974
 Terminate: April 1977

Location: Department of Veterinary Science
 Washington State University
 Pullman, Washington 99163

Objectives:

Develop assay for infectious agent of Theiler's disease, describe physical and antigenic properties of equine adenoviruses, develop rapid immunofluorescent techniques for equine viral diagnosis, define role of complement in neutralization of equine herpes, determine the prevalence of selected equine virus infections. Determine prevalence of immunodeficiency disorders in horses, develop rapid procedures for evaluating cellular and humoral immunity, study ontogeny of lymphoid development in the equine fetus, determine immunoglobulin in aborted foal sera.

Approach:

The virologic studies will use tissue culture and serologic procedures that are established in our laboratory to attempt to characterize the agent causing Theiler's disease and to obtain and study adenovirus isolates. Immunofluorescence will be used to expedite viral diagnosis and the role of complement in neutralization of equine herpes viruses will be evaluated in order to improve neutralization tests. The prevalence of certain virus infections in horses is unknown and will be determined serologically to evaluate their significance to the horse industry. The approach in immunologic studies is to improve diagnostic procedures for evaluating the immune response and to use these procedures to determine the significance of immunologic disorders in predisposing horses to infections and death. Evaluating the influence of the fetal immune response on abortions and the use of this immune response in arriving at a diagnosis of abortion could be useful in understanding and preventing this problem.

Animal Identification

157

Investigator: R. K. Farrell
Start: 1974
Terminate: 1975

Location: Agricultural Research Service
Washington State University
Pullman, Washington 99163

Objective:

Develop techniques for identification of horses and other animals and develop systems for recording data for rapid retrieval.

Approach:

Selectively and painlessly destroy cellular tissues to produce visual marks on animal according to predetermined patterns and mathematically derived symbols, which are unalterable and permanent. Use coherent light and cryogenic and biochemical agents to accomplish the above.

Endoparasite Transmission of Infectious Diseases

158

Investigator: J. R. Gorham
Start: 1967
Terminate: Indefinite

Location: Agricultural Research Service
Washington State University
Pullman, Washington 99163

Objectives:

Determine the persistence and transmission of certain diseases of horses and other domestic animals by internal parasites as laboratory systems for the study of endoparasitic transmission. Determine if parasitism can activate latent virus infections.

Approach:

Strongylus spp. and other parasites will be utilized. Life cycle of each parasite will be established, some under axenic cultivation. Cycles will include transmission from definitive host through its intermediate host and back to the definitive host. Agents that will be studied include equine infectious anemia.

Diagnosis of Equine Infectious Anemia

159

Investigator: T. C. McGuire
Start: January 1974
Terminate: January 1979

Location: Washington State University
Pullman, Washington 99163

Objective:

Conduct comparative investigations directed to the development of a diagnostic procedure for equine infectious anemia.

Approach:

The investigations will include the performance and evaluation of liver biopsy, sideroleukocytic test, serum protein determinations, complement fixation tests, hemagglutination test, precipitin test and virus isolation. The Texas, Washington, and Japanese strains of equine infectious anemia virus will be used in the investigations.

Investigator: T. C. McGuire
Start: September 1974
Terminate: Indefinite

Location: School of Veterinary Medicine
Washington State University
Pullman, Washington 99163

Objectives and Approach:

Define the combined immunodeficiency defect (CID) in foals by characterizing the in vivo and th vitro B- and T-lymphocyte responses to antigens and plant lectins. Investigations of CID in young horses demonstrated that this fatal genetic defect in foals is very similar to CID in children. Foals closely related to those with CID will be evaluated for lymphocyte defects. Evaluate the complement systems, secretory component and function of the epithelial cells of hypoplastic thymuses. Determine the biochemical defect and/or its expression in the lymphoid system. Relate the findings to the absence of antibody and cell-mediated immunity. The amounts of adenosine deaminase in CID and normal foals will be determined. The mixed lymphocyte culture response of CID and carrier horses will be studied to determine if abnormalities are present. Attempts to induce CID stem cells to produce committed lymphocytes will be made. Attempt methods of therapy in CID foals. Transfer factor will be evaluated for its role in CID foals. Correction of the defect in foals will be attempted with metaphase chromosomes from normal bone marrow stem cells.

Wisconsin

Chemoreceptors and Ventilatory Control

161

Investigator: G. E. Bisgard
Start: July 1973
Terminate: August 1976

Location: Department of Veterinary Science
University of Wisconsin
Madison, Wisconsin 53706

Objectives:

More clearly elucidate the mechanisms of ventilatory control during acclimatization to chronic hypoxia, and determine what role the peripheral chemoreceptors have in this acclimatization. Establish more adequately what functions the peripheral chemoreceptors have in normal resting ventilation at sea level as well as at high altitude. The ventilatory control system during exercise in normoxia and chronic hypoxia will also be examined.

Approach:

The investigation will be carried out in ponies at rest and during exercise. Measurements of resting ventilation and the ventilatory response to acute isocapnic hypoxia, acute hypercapnia, and doxapram hydrochloride infusion will be made. Cerebrospinal fluid pH, PCO₂, PO₂, lactate and norepinephrine metabolite analysis will be carried out. All measurements will be done before and after carotid body excision, aortic body excision, both carotid and aortic body excision and during acclimatization to chronic hypoxia in normal and totally chemodenervated animals.

Investigator: G. E. Bisgard
Start: July 1972
Terminate: June 1977

Location: University of Wisconsin
Madison, Wisconsin 53706

Objectives:

Study field cases of air conditioning disease and other respiratory diseases found in selected problem herds of dairy cattle, influenza in the equine species, Maedi in sheep, swine influenza and infectious bovine rhinotracheitis in cattle. An effort will be made to find distinguishing physiopathological features of each disease investigated in the early and chronic stages of its course.

Approach:

Experimental cases of equine and swine influenza will be studied. Cases of the other diseases referred to under objectives also will be studied.

Blood Carbonic Anhydrases in Humans, Horses, Cattle and Goats

163

Investigator: E. F. Deutsch
Start: 1954
Terminate: Indefinite

Location: University of Wisconsin
Madison, Wisconsin 53706

Objective and Approach: Not Provided

Equine Reproductive Physiology

164

Investigator: N. L. First
Start: January 1969
Terminate: January 1990

Location: University of Wisconsin
Madison, Wisconsin 53706

Objectives:

Characterize the reproductive cycle of the mare. Determine the endocrine changes during the estrous cycle which control the reproductive events of the estrous cycle. Determine the relative efficiency of sperm transport in the mare at various stages of the estrous cycle. Develop methods for predicting the time of ovulation in the mare. Develop methods for synchronizing the estrous cycles of mares.

Approach:

Mares will be studied at 5 stages of the estrous cycle, days 2, 4, 7, 11 and 17. They will be inseminated the day before specimen collection. Spermatozoa will be recovered and quantitated from the vagina, uterus and oviducts. The anatomical size and histological changes in the oviducts, uterus, cervix and vagina will be determined as well as the size of the ovary and size and number of ovarian structures. FSH and LH hormone levels of the anterior pituitary gland will be determined as well as progesterone content of the corpora lutea. Estrous synchronization will be attempted with a separate group of mares using compounds which prevent estrus and ovulation such as ICI 33828. If compounds and doses are found which synchronize estrus and ovulation a field trial will be conducted to determine the effectiveness of the synchronization method.

Investigator: O. J. Ginther
Start: July 1970
Terminate: June 1976

Location: University of Wisconsin
Madison, Wisconsin 53706

Objectives:

Determine whether a uterine luteolysin reaches the corpus luteum through a direct venoarterial pathway between a uterine horn and the adjacent ovary; study the optimal doses and routes of administration of prostaglandin F(2a) for induction of luteal regression in horses and sheep.

Approach:

The local uteroovarian pathway will be studied in unilaterally hysterectomized sheep by anastomosis of uterine vein or ovarian artery from the uterine intact side to the corresponding vessel on the hysterectomized side. Systemic (S.C.) route of administration will be compared to local (intrauterine) route using doses which range from 1 to 6 mg in pony mares and sheep.

Wildlife Reservoirs of Arboviruses

166

Investigator: R. P. Hanson
Start: 1972
Terminate: June 1976

Location: University of Wisconsin
Madison, Wisconsin 53706

Objectives:

Study the ecology and significance of arbovirus infections of livestock and man in Wisconsin. Primary emphasis is placed on California encephalitis group of viruses, namely LaCrosse Virus, Trivittatus Virus, Jamestown Canyon Virus and Snowshoe Hare Virus.

Approach:

A ten-year study of the natural history of arboviruses in Wisconsin based on isolation of virus and demonstration of specific antibodies in man, livestock and wild animals established that the California group of viruses were the most common of the arboviruses and that one of them induced disease and death in man. A Bunyamwera group virus and western and eastern encephalitis viruses produced disease in horses and wildlife. Primary emphasis is now placed on study of the relationship between the viruses and known vectors and on relationship between the viruses and the probable reservoir hosts: the gray squirrel, the chipmunk, cottontail rabbit and white tailed deer.

Investigation of Fetal Mortality in Cows, Mares and Sows

167

Investigator: K. J. Betteridge Location: Animal Diseases Research Inst.
Start: 1969 Ottawa, Ontario K2H 8P9
Terminate: Indefinite

Objectives:

Develop means of detecting early fetal life in order to investigate the pathogenesis of some forms of prenatal mortality.

Study of Equine Infectious Anemia

168

Investigator: P. Boulanger Location: Animal Disease Research Inst.
Start: 1969 Hull, Quebec, Canada
Terminate: Indefinite

Objectives:

Develop methods for the propagation of EIA virus in tissue culture. Develop serological methods permitting the demonstration of the virus in infected tissues and the demonstration of antibodies in the serum of exposed, disease and immunization animals. Study the susceptibility of equines and other species of animals to the virus with special regard to distribution of the virus in the organs and to the development of antibodies in the blood serum. Study the haematology and pathology in experimentally and naturally infected animals.

Chronic Weight Loss of Horses

169

Investigator: D. G. Butler Location: Ontario Veterinary College
Start: 1975 University of Guelph
Terminate: 1976 Guelph, Ontario, Canada

Objectives:

Compare glucose and xylose absorption in horses with a history of chronic weight loss either with or without "Cow Dung Diarrhea" and compare these results with data obtained using comparable sized normal horses on the same diet. Measure intestinal transit time in normal and affected horses before, during and after administration of therapeutic treatment.

Studies of Trypanosoma Equiperdum

170

Investigator: J.A.J. Carriere Location: Animal Disease Research Inst.
Start: 1970 Hull, Quebec, Canada
Terminate: Indefinite

Objective:

Produce Trypanosoma equiperdum antiserum in the horse for complement-fixation

test and adapt the techniques of Trypanosoma equiperdum antigen production and storage, with reference to propagation and to storage of live trypanosomes in liquid nitrogen.

Electrocardiogram of the Standardbred Horse

171

Investigator:	R. S. Downey	Location:	Ontario Veterinary College
Start:	1975		University of Guelph
Terminate:	Indefinite		Guelph, Ontario, Canada

Objectives:

Record and describe the various characteristics of the electrocardiogram of the normal standardbred horse at rest and immediately following vigorous exercise.

Vasoactive Mediators of Pulmonary Hypersensitivity in the Horse

172

Investigator:	P. Eyre	Location:	Ontario Veterinary College
Start:	1975		University of Guelph
Terminate:	1977		Guelph, Ontario, Canada

Objectives:

Evaluate the isolated rat mast cell (RMC) test using equine reaginic serum. Develop the test as an aid to the diagnosis of immediate type hypersensitivity in the horse. Measure vasoactive agents evolved from horse lung during immediate-type hypersensitivity reactions.

Study on the Viruses of Equine Rhino-Pneumonitis and Equine Vulvitis-Balanitis

173

Investigator:	A. Girard	Location:	Animal Disease Research Inst.
Start:	1969		Hull, Quebec, Canada
Terminate:	Indefinite		

Objectives:

Devise convenient serological methods that permit rapid detection of the viruses in submitted field material or in tissue cultures from such material, rapid differentiation of the viruses in such preparations, detection of antibodies in sera of immunized and naturally infected horses, and characterization of equine vulvitis-balanitis virus.

Respiratory Diseases of Horses at Ontario Racetracks

174

Investigator: D. G. Ingram
Start: 1972
Terminate: 1976

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Determine the prevalence and incidence of the major respiratory pathogens of horses, by means of virological, bacteriological and serological surveillance. Assess the efficacy of vaccination against equine influenza. Carry out epizootiological studies on age-related incidence of influenza and the effect of vaccination on spread of the disease.

Effects of Thiamin on Horses

175

Investigator: F. M. Loew
Start: July 1975
Terminate: June 1978

Location: University of Saskatchewan
Sackatoon, Canada
S7N 0W0

Objectives:

Determine the effects of thiamin on racehorse performance and study the synthesis and absorption of thiamin in horses.

Approach:

Perform studies plus laboratory experiments.

Erythrocyte Metabolism, Binding Capacity and Lifespan in the Normal Horse

176

Investigator: J. H. Lumsden
Start: 1972
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Complete statistical analyses of sizing data from the Coulter channellizer used in studies during 1974 when the response the hemolytic and hemorrhagic anaemia was compared to control horses. Red cell count, hematocrit, hemoglobin, indices, leucocyte and platelet counts were monitored during the response phase. Changes in iron, iron binding capacity, 2, 3-DPG and glutathione were examined.

Thyroid Function in the Standardbred and Thoroughbred Horse

177

Investigator: J. H. Lumsden
Start: 1975
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Establish the 95% confidence interval for iodothyronine T_3 , T_4 and T_7 values from healthy standardbred and thoroughbred horses in Ontario. Determine the response to thyroid stimulating hormone (TSH) in at least 20 horses to establish the

Thyroid Function in the Standardbred and Thoroughbred Horse (continued) 177

degree of response in normal horses. Determine the T_3 , T_4 and T_7 values in clinical cases with signs possibly related to thyroid disorders.

Equine Ossification and Fusion Sites 178

Investigator: F. J. MacCallum Location: Western College of Veterinary
Start: 1970 Medicine
Terminate: 1980 University of Saskatchewan
Saskatoon, Canada S7N 0W0

Objective:

Interpret radiologically the ossification and fusion of limbs of horses.

Approach:

Label live animals, then radiograph, section bones and examine under ultraviolet irradiation.

Strongyle Parasites of Horses 179

Investigator: B. M. McCraw Location: Ontario Veterinary College
Start: 1970 University of Guelph
Terminate: Indefinite Guelph, Ontario, Canada

Objectives:

Develop a vaccine against the large strongyles through the attenuation of infective strongyle larvae by irradiation techniques. Study the mechanisms of exsheathment of infective larvae and the antigenic properties of exsheathing fluids and post-ecdysis metabolites. Study the pathogenesis and migration of individual species of strongyles, especially members of the genus Strongylus. Determine the factors affecting the survival of strongyle larvae on pasture, e.g., overwinter survival.

Cardiopulmonary Function in Equine Colic 180

Investigator: W. N. McDonell Location: Ontario Veterinary College
Start: 1975 University of Guelph
Terminate: Indefinite Guelph, Ontario, Canada

Objectives:

Monitor pre-operative, operative and post-operative respiratory function of spirometry, blood gas and acid base determination, lactate determination and assess the arterial-mixed venous oxygen content difference ($a - \bar{v} O_2$ difference). Evaluate the correlation of $a - \bar{v} O_2$ difference and lactate levels and the use of these values as a prognostic guide as to the "reversibility" of the shock state. Screen a selected group of colic cases for evidence of the occurrence of deleterious osmolarity and electrolyte shifts during surgery and anaesthesia.

Hyponatremia and Hyperlipemia in Horses

181

Investigator: B. J. McSherry Location: Ontario Veterinary College
Start: 1975 University of Guelph
Terminate: Indefinite Guelph, Ontario, Canada

Objectives:

Measure the following in 20 normal and 20 abnormal horses: serum sodium, potassium, chloride; blood glucose; urea; serum osmolality; total protein and solids of serum; serum cholesterol and cholesterol esters; total lipids; lipoprotein levels in serum and triglycerides. Determine if there are differences in the above between normal and abnormal horses. Special emphasis will be placed on the relationship between serum sodium and serum osmolality and between serum sodium and plasma lipids.

Infertility - an Investigation of the Causes of Abortion in Mares

182

Investigator: D. Mitchell Location: Animal Disease Research Inst.
Start: 1969 Hull, Quebec, Canada
Terminate: Indefinite

Objective:

Determine the incidence and causes of abortion in horses, particularly on farms where mares are kept for the production of natural estrogen.

Studies on a Commercial Modified Live Rhinopneumonitis (RP) Virus Vaccine Administered by Intramuscular Injection

183

Investigator: D. Mitchell Location: Animal Disease Research Inst.
Start: 1973 Ottawa, Ontario K2H 8P9
Terminate: Indefinite

Objectives:

Determine if the subject vaccine will cause abortion in susceptible mares and provide protection against abortion following challenge with virulent RP virus. Monitor the serological response in vaccinated and challenged animals.

Studies on Ovulation and Fertility in the Mare Utilizing a Synthetic Luteinizing Hormone Releasing Factor (LHRF)

184

Investigator: D. Mitchell Location: Animal Disease Research Inst.
Start: 1974 Ottawa, Ontario K2H 8P9
Terminate: Indefinite

Objectives:

Determine if treatment with LHRF will significantly reduce the number of services required at each estrus. Determine whether treatment with LHRF has any detrimental effect on conception rate. Assess the benefits to be derived from such treatment, particularly with respect to the use of artificial insemination.

Salmonellosis, Tetracycline Therapy and Surgical Stress in the Horse

185

Investigator: R. R. Owen
Start: 1975
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Establish an association between surgical stress and the precipitation of salmonellosis in the horse. The role of tetracyclines in this syndrome will be examined as to its possible detrimental effects within the syndrome.

Avascular Necrosis of the Equine Third and Central Tarsal Bones

186

Investigator: R. R. Owen
Start: 1975
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Characterize the biochemical changes that occur during the maturation of normal neonatal equine bone and compare this study with the biochemical values obtained from colts affected with avascular necrosis of the 3rd and central tarsal bones.

Selenium and Vitamin E in Horses with Nutritional Myopathy

187

Investigator: R. R. Owen
Start: 1975
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Obtain information on Selenium and Vitamin E levels in serum and Selenium levels in hair and the feed of affected, contact and normal horses. Confirm that nutritional myopathy in adult horses is caused by Selenium and vitamin E deficiency, and that a subclinical form of the deficiency may be more widespread in southern Ontario (a Selenium deficient area) than was known previously.

Stablization of the Equine Cervical Spine Using Bone Cement

188

Investigator: R. R. Owen
Start: 1975
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objective:

Evaluate the practicality of using bone cement for correcting cervical vertebral instability ("Wobbler Syndrome") in the horse.

Pasture Survival & Development of Nematode Parasites of the Horse

189

Investigator: L. R. Polley
Start: July 1975
Terminate: 1976

Location: Western College of Veterinary
Medicine
University of Saskatchewan
Saskatoon, Canada S7N 0W0

Objectives:

Determine, through the year, the development and survival of the free-living stages of some intestinal nematodes in horses and apply this information to the epidemiology of the parasites in the prairies and to the formulation of measures suitable for their control.

Role of the Fetus in Hormonal Regulation of Gestation in the Horse

190

Investigator: J. I. Raeside
Start: 1970
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Studies on the endocrine activity of the fetal testes and ovaries are being made to obtain insight into the possible involvement of the fetus itself in some aspects of hormonal imbalance in pregnancy which might lead to abortion in the mare. The results of fetal castration are being examined for their effects on amounts of estrogens formed by the placenta and maintenance of pregnancy.

Arteriography in Strongylus Vulgaris Infection in Equine

191

Investigator: J. O. D. Slocombe
Start: 1975
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objective:

Determine the usefulness of arteriography in the diagnosis of S. vulgaris infections of the cranial mesenteric artery.

Studies on Equine Helminths

192

Investigator: H. J. Smith
Start: 1967
Terminate: Indefinite

Location: Sackville, New Brunswick,
Canada

Objective:

Evaluate the efficacy of treatment and the role of inhibited larvae in the epidemiology of gastro-intestinal parasitism in equines.

Investigator: R. A. Willoughby
Start: 1974
Terminate: Indefinite

Location: Ontario Veterinary College
University of Guelph
Guelph, Ontario, Canada

Objectives:

Conduct respiratory function tests on normal horses and horses with respiratory disorders. Develop respiratory function data and patterns for various diseases. Test the effect on respiratory function of various therapeutic agents and of the inhalation of aeroallergens.

SUBJECT OF RESEARCH PROJECT

	<u>Total Funds</u>	<u>Total Scientist Years</u>	<u>Projects</u>
BEHAVIOR	\$ 5,000	0	2
Anthropology 026			
Behavior 121			
Drug Detection (see Pharmacology)			
Encephalitis (See Pathology)			
Lameness (see Pathology)			
Neurology (see Physiology)			
Wobbler (see Pathology--ataxia)			
ECONOMICS	6,078	0.3	2
Cost return analysis 085			
Marketing 086			
Market analysis 086			
ENTOMOLOGY	94,569	0.9	5
Arthropods 021, 024, 122, 125			
Biological control 122			
Disease vectors 021, 125			
Pest control 024, 122			
Pesticides 131			
EPIDEMIOLOGY	0	0	6
Disease surveys 004, 027, 046			
Environment 111, 005			
Identification 157			
GENETICS	6,759	0.1	5
Cytogenetics 128, 135			
Genetics 155, 163, 060			
IMMUNOLOGY	234, 817	2.8	21
Allergy (see Hypersensitivity)			
Anaphylaxis (see Hypersensitivity)			
Antibodies 048, 052, 069, 071, 076, 114, 156			
Antigens 070			
Development of immunological competence (see ontogeny)			
Disease resistance (also see Physiology) 006, 014, 043, 052, 071, 076			
Hypersensitivity 172			
Immunoglobulins 006, 022, 043, 048, 052, 071, 102, 156, 160, 069, 076, 114, 163, 172			
Immunoparasitology 179			
Interferon (see Physiology)			
Ontogeny 102, 156, 160, 006			

SUBJECT OF RESEARCH PROJECT (continued)

	<u>Total Funds</u>	<u>Total Scientist Years</u>	<u>Projects</u>
IMMUNOLOGY (continued)			
Transplantation 014			
Vaccines 034, 058, 076			
INFECTIOUS DISEASES	\$1,088,336	10.3	46
African horse sickness (see Viral diseases) 119			
Arboviral diseases 018, 019, 020, 082, 119, 166			
Babesiasis (see Parasitology)			
Bacterial diseases 066, 069, 073, 118, 130, 174, 018			
Babesia (see Parasitology)			
Diarrhea (see Pathology - enteritis)			
Disease transmission (see Entomology - disease vectors)			
Encephalitis 018, 019, 020, 082, 150, 166			
Equine Infectious Anemia (EIA) 029, 057, 079, 080, 116, 117, 151, 152, 159, 168			
Equine Serum Hepatitis 011, 012, 066			
Equine Viral Abortion (EVA) 016, 066, 067, 173, 183			
Equine rhinopneumonitis (see Equine viral abortion)			
Equine Herpesvirus (see Equine Viral abortion)			
Fungal diseases (see Mycoses)			
Influenza 058, 074			
Respiratory diseases 003, 006, 066, 118, 174			
Rhinopneumonitis (see Equine viral abortion and viral diseases)			
Salmonellosis 185			
Swamp fever (see Equine infectious anemia)			
Transmission of (see Entomology - vectors) 158			
Vaccines (see Immunology)			
Venezuelan Equine Encephalitis (VEE) 018, 019, 020, 021, 022, 023, 043, 153			
Viral diseases 003, 006, 018, 019, 020, 021, 022, 023, 011, 012, 016, 043, 050, 066, 057, 067, 070, 074, 082, 118, 119, 150, 151, 152, 153, 159, 166, 168, 173, 174, 183			
Viral encephalitis (see Encephalitis)			
NUTRITION	480,527	5.5	23
Calcium (see Minerals, feed) 031, 063			
Deficiencies 049, 055			
Diet 038, 045, 059, 099, 120, 126, 136, 154			
Digestion (see Physiology)			

SUBJECT OF RESEARCH PROJECT (continued)

NUTRITION (continued)	Total Funds	Total Scientist Years	Projects
Energy 064			
Feed (Nutritive value, requirements, utilization) 005, 045, 055, 059, 063, 099, 126, 136, 138, 145			
Intestinal absorption (see Physiology)			
Metabolism (see Physiology)			
Minerals (see Feed) 049, 063, 120, 126			
Protein (see Feed) 030, 065, 120, 140, 145			
Selenium (see Feed) 055, 138, 187			
Vitamins 030, 055, 112, 175, 187			
PARASITOLOGY	\$515,292	5.2	17
Anthelmintics (see Prevention and Treatment) 002, 027, 046, 068, 083, 104, 137, 192			
Biological control (see Prevention and Treatment) 076, 137, 179			
Biology of parasites 027, 087, 137, 146, 179, 189			
Blood parasites (see Protozoology)			
Helminthology 191			
Immunoparasitology (see Immunology)			
Prevention and Treatment 004, 027, 068, 191			
Protozoology 084, 170			
PATHOLOGY	\$422, 263	4.7	47
Abortion (see Reproduction and infectious diseases)			
Anatomical Pathology 015			
Anemia (see Infectious disease equine infectious anemia) 051			
Arthritis (see Joint diseases)			
Bone diseases 049, 126, 178, 186, 188			
Cancer (see Neoplasms)			
Cardiovascular disease 191			
Congenital abnormalities 066			
Diarrhea (see Enteritis)			
Encephalitis (see Encephalopathies Infectious Diseases) 018, 020			
Enteritis 066, 143, 169			
Epistaxis (nosebleed) 109			
Founder (see Laminitis)			
Hepatic (liver) disease 011, 012			
Immunopathology (see Immunology)			
Joint diseases 089, 115, 126			
Lameness 007, 013, 025, 077, 107, 143			
Laminitis (founder) 097, 103, 106, 108			
Muscular pathology 013			
Neoplasms (tumors) 088, 141			
Neuropathies 188			
Physiological pathology 007, 013, 015			

SUBJECT OF RESEARCH PROJECT (continued)

PATHOLOGY (continued)	<u>Total Funds</u>	<u>Total Scientist Years</u>	<u>Projects</u>
Reproductive disease 016 Respiratory diseases 006, 075, 096, 098, 100, 113, 142, 162			
Stress 062, 106, 111, 105 Vascular 133			
PHARMACOLOGY	\$226,214	2.4	8
Anesthesia 017, 090 Anthelmintics (see Parasitology) Drug detection 081, 123 Drug therapy (see Therapy) Euthanasia (see Anesthesia) Therapy (see Infectious diseases) 089, 105, 110, 148			
PHYSIOLOGY	\$317,815	4.3	43
Bone 025, 126 Brain (see Neurology) Blood volume (see Hematology) Cardiovascular physiology 171, 180 Digestion 031, 036, 038, 129, 134 Electrocardiology (see Cardiovascular physiology) Electroencephalography (see Neurology) Endocrinology (see Reproduction) 008, 037, 039, 177 Enzymes 009, 063 Exercise 007, 013, 025, 038, 112 Gestation(see Reproduction) Gonadotropins (see Reproduction) Growth 037, 047, 104 Heart (see Cardiovascular physiology) Hematology 062, 124, 127, 176, 181 Interferon 029 Intestinal absorption 129, 169 Joints 025 Lactation 038, 071, 101 Metabolism 028, 126, 181 Milk (see Lactation) Muscle 035, 036 Nerve 035, 036 Resistance 007, 017, 026, 049, 070 Respiration 010, 098, 132, 161, 193 Reproduction (see Reproduction)			
RADIOLOGY	0	0	1
X-ray 178			

SUBJECT OF RESEARCH PROJECT (continued)

	<u>Total Funds</u>	<u>Total Scientist Years</u>	<u>Projects</u>
REPRODUCTION	\$ 347,706	4.1	28
Abortion, non-infectious (see Infectious diseases) 167, 182			
Artificial insemination 041			
Embryo Transfer 042			
Estrogens 008, 039			
Gestation 104, 190			
Gonadotropins 008, 016, 033, 172, 165			
Infertility, non-infectious 016, 104, 167, 182			
Luteinizing hormone 008, 016, 033, 039, 072, 165, 184			
Male, 001, 041, 135			
Ovaries 016, 033, 039, 072, 165, 184			
Ovulation control 008, 032, 040, 059, 078, 091, 095, 164, 165			
Pregnancy Test 149			
Progestagens 008, 016, 033, 039, 072			
Releasing hormone 184			
Sterility, physiological (see Infertility)			
SURGERY	\$ 8,406	0.3	5
Anesthesia (see Pharmacology)			
General surgery 061, 094, 126, 185, 188			
TOXICOLOGY	\$ 188,381	1.5	8
Mycotoxicoeses 056, 147			
Poisoning 034, 044, 053, 092, 131			
Poisonous plants 139			
GRAND TOTALS	\$3,942,163	42.4	268

Averages: \$92,976 per SY; \$20,426 per project; 0.2 SY per project

INVESTIGATORS

Ahlborn, R. E. - 026	Evans, J. W. - 008
Albert, R. E. - 113	Eyre, P. - 172
Albert, W. W. - 038	
Allen, P. Z. - 114	Farrell, R. K. - 157
Ardans, A. A. - 006	First, N. L. - 164
	Foster, N. M. - 019
Bahr, J. M. - 039	Freeman, M. J. - 048
Baker, B. E. - 115	Frerichs, W. M. - 084
Baker, J. P. - 063, 064, 065	
Beadle, R. E. - 075	Gallagher, K. F. - 092
Beckett, S. D. - 001	Gallina, A. M. - 049
Beeson, W. M. - 045	Garner, H. E. - 105, 106, 107, 108
Bello, T. R. - 002, 076	Gideon, L. A. - 093, 094
Bennett, D. G. - 046	Gillespie, J. R. - 010
Betteridge, K. J. - 167	Ginther, O. J. - 165
Bisgard, G. E. - 161, 162	Girard, A. - 173
Boulanger, P. - 168	Girish, V. W. - 011
Bowen, J. M. - 035	Goetsch, D. D. - 036
Bowne, J. G. - 018	Gorham, J. R. - 158
Boyd, L. H. - 104	Graves, C. N. - 041, 042
Bradley, R. E. - 027	Gribble, D. G. - 012
Brady, W. W. - 005	Gronwall, R. R. - 028
Brown, J. F. - 004	Gustafson, D. P. - 050
Busch, R. H. - 100	
Butler, D. G. - 169	Hanson, R. P. - 166
	Harbers, L. H. - 059
Calliham, M. R. - 148	Haynes, P. F. - 077
Carlson, G. P. - 007	Hershberger, T. V. - 140
Carriere, J. A. J. - 170	Hightower, D. - 149
Catts, E. P. - 024	Hintz, H. F. - 120
Coggins, L. - 116, 117, 118	Holliday, T. A. - 013
Colglazier, M. L. - 083	Holtan, D. - 136
Conner, G. H. - 089, 090	Houpt, K. A. - 121
Crawford, B. H. - 047	Hudson, L. W. - 145
Crawford, T. B. - 156	
Crowe, M. W. - 066	Ingram, D. G. - 174
Cysewski, S. J. - 056	
	Jenness, R. - 101
Dardiri, A. H. - 119	Jochim, M. M. - 020
Darlington, R. W. - 067	Johnson, J. H. - 109, 110
Deutsh, E. F. - 163	Jones, R. H. - 021
Dill, D. B. - 111	
Downey, R. S. - 171	Kingsbury, H. B. - 025
Drudge, J. H. - 068	Kistner, T. P. - 137
Dukelow, W. R. - 091	Kloos, W. E. - 130
Dunn, M. F. - 009	Kreider, J. L. - 078
Dziuk, P. J. - 040	

Lank, R. B. - 079
 Lawrence, R. G. - 085, 086
 Leipold, H. W. - 060
 Ley, K. D. - 029
 Lichtenfels, J. R. - 087
 Liu, P. V. - 069
 Loew, F. M. - 175
 Lumsden, J. H. - 176, 177
 Lund, J. E. - 051

 MacCallum, F. J. - 178
 McClure, J. J. - 102, 103
 McCollum, W. H. - 070
 McConnell, S. - 150
 McCraw, B. M. - 179
 McDonell, W. N. - 180
 McGuire, T. C. - 159, 160
 McSherry, B. J. - 181

 Main, A. R. - 131
 Malmquist, W. A. - 057
 Marshak, R. R. - 141
 Marshall, R. E. - 142
 Matthysee, J. G. - 122
 Maylin, G. - 123
 Merritt, A. M. - 143
 Moffat, J. K. - 124
 Moore, R. W. - 151, 152
 Morgan, D. (Colorado) - 022
 Morgan, D. (Illinois) - 043
 Morgan, D. O. - 071
 Morter, R. L. - 052
 Mosier, J. E. - 061

 Natusch, D. F. - 044
 Noblet, G. P. - 146

 Oldfield, J. E. - 138
 Olson, J. K. - 153
 Ott, E. A. - 030, 031
 Owen, R. R. - 185, 186, 187, 188
 Oxender, W. D. - 095

 Pechuman, L. L. - 125
 Pimmel, R. L. - 132
 Polley, L. R. - 189
 Potter, G. - 154
 Priester, W. A. - 088
 Purohot, R. C. - 003

 Raeside, J. I. - 190
 Robinson, F. R. - 053
 Robinson, N. E. - 096, 097, 098
 Rooney, J. P. - 144
 Roth, E. E. - 080

 Schryver, H. F. - 126
 Sharma, O. P. - 072
 Sharp, D. C. - 033, 034
 Short, C. R. - 081
 Shupe, J. L. - 155
 Simon, S. R. - 127
 Simpson, E. F. - 034
 Siniscalco, M. - 128
 Slocombe, J. O. D. - 191
 Smith, A. - 014, 015
 Smith, C. R. - 133
 Smith, H. J. - 192
 Smith, J. E. - 062
 Snyder, S. P. - 139
 Stabenfeldt, G. H. - 016
 Steffey, E. P. - 017
 Stevens, C. E. - 129
 Swartzwelder, J. C. - 082
 Swerczek, T. W. - 073

 Tamoglia, T. W. - 058
 Tyznik, W. J. - 134

 Ullrey, D. E. - 099

 Vandernoot, G. W. - 112
 Van Sickle, D. C. - 054
 Vanvleet, J. F. - 055

 Wagner, T. E. - 135
 Walton, T. E. - 023
 Wilhelmi, A. E. - 037
 Willoughby, R. A. - 193
 Wilson, B. J. - 147
 Wilson, J. - 074

PERFORMING ORGANIZATIONS

Project Accession Numbers

ALABAMA:

School of Veterinary Medicine	001, 002, 003
Auburn University, Auburn, Alabama 36830	

ARIZONA:

School of Engineering	005
Arizona State University	
Tempe, Arizona 85281	

ARKANSAS:

Arkansas Agricultural Experiment Station	004
University of Arkansas	
Fayetteville, Arkansas 72701	

CALIFORNIA:

Department of Animal Science	008
University of California	
Davis, California 95616	

Department of Biochemistry	009
University of California	
Riverside, California 92507	

School of Medicine	013
University of California	
Davis, California 95616	

School of Veterinary Medicine	006, 007, 010,
University of California	012, 014, 015,
Davis, California 95616	016, 017

University of California	011
San Francisco, California 94102	

COLORADO:

Animal Disease Research Laboratory	018, 019, 020,
Agricultural Research Service, USDA	021, 022, 023
Federal Center Building 45	
Denver, Colorado 80225	

PERFORMING ORGANIZATIONS (continued)

Project Accession Numbers

DELAWARE

University of Delaware	024
Agricultural Experiment Station	
Newark, Delaware 19711	

University of Delaware	025
School of Engineering	
Newark, Delaware 19711	

DISTRICT OF COLUMBIA

Smithsonian Institution	026
Museum of History and Technology	
Washington, D. C. 20560	

FLORIDA:

College of Veterinary Medicine	028
University of Florida	
Gainesville, Florida 32601	

University of Florida	027, 029, 030
Gainesville, Florida 32601	031, 032, 033
	034

GEORGIA:

Agricultural Experiment Station	036
University of Georgia	
Athens, Georgia 30601	

College of Veterinary Medicine	035
University of Georgia	
Athens, Georgia 30601	

Department of Biochemistry	037
School of Dentistry	
Emory University	
Atlanta, Georgia 30303	

ILLINOIS:

Agricultural Experiment Station	038, 039, 040,
University of Illinois	041, 042
Urbana, Illinois 61801	

PERFORMING ORGANIZATIONS (continued)

ILLINOIS: (continued)

Project Accession Numbers

College of Veterinary Medicine
University of Illinois
Urbana, Illinois 61801

043

Department of Chemistry
University of Illinois
Urbana, Illinois 61801

044

INDIANA:

Department of Animal Science
Purdue University
Lafayette, Indiana 47907

045

School of Veterinary Medicine
Purdue University
Lafayette, Indiana 47907

046, 047, 048,
049, 050, 051,
052, 053, 054,
055

IOWA:

Animal and Plant Health Inspection Service, USDA
Veterinary Services
P. O. Box 70
Ames, Iowa 50010

058

National Animal Disease Center
P. O. Box 70
Ames, Iowa 50010

056, 057

KANSAS:

College of Veterinary Medicine
Kansas State University
Manhattan, Kansas 66504

060, 061, 062

Kansas Agricultural Experiment Station
Kansas State University
Manhattan, Kansas 66504

059

PERFORMING ORGANIZATIONS (continued)

	Project Accession Numbers
KENTUCKY:	
Agricultural Experiment Station University of Kentucky Lexington, Kentucky 40506	063, 064, 065, 066, 071
Department of Veterinary Science University of Kentucky Lexington, Kentucky 40506	067, 068, 070, 072, 073, 074
Health Sciences Center University of Louisville Louisville, Kentucky 40201	069
LOUISIANA:	
Department of Animal Science Louisiana State University Baton Rouge, Louisiana 70803	078
Department of Veterinary Science Louisiana State University Baton Rouge, Louisiana 70803	075, 076, 077, 079, 080, 081
School of Medicine Louisiana State University Baton Rouge, Louisiana 70803	082
MARYLAND:	
Animal Parasitology Institute Agricultural Research Center Beltsville, Maryland 20705	084, 087 083
University of Maryland College Park, Maryland 20742	085, 086
U.S. Public Health Service National Institutes of Health Bethesda, Maryland 20014	088

PERFORMING ORGANIZATIONS (continued)

Project Accession Numbers

MICHIGAN:

Agricultural Experiment Station Michigan State University East Lansing, Michigan 48823	099
College of Veterinary Medicine Michigan State University East Lansing, Michigan 48823	089, 090, 092, 093, 094, 095, 096, 097, 098
Michigan State University East Lansing, Michigan 48823	091

MINNESOTA:

Agricultural Experiment Station University of Minnesota St. Paul, Minnesota 55101	101, 102, 103
College of Veterinary Medicine University of Minnesota St. Paul, Minnesota 55108	100

MISSISSIPPI:

Mississippi State University State College, Mississippi 39762	104
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MISSOURI:

College of Veterinary Medicine University of Missouri Columbia, Missouri 65201	105, 106, 107, 108, 109, 110
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NEVADA:

Desert Research Institute University of Nevada Reno, Nevada	111
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NEW JERSEY:

Department of Animal Science Rutgers University New Brunswick, New Jersey 08903	112
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PERFORMING ORGANIZATIONS (continued)

	Project Accession Numbers
NEW YORK	
Animal Disease Center, USDA Greenport, New York 11944	119
College of Veterinary Medicine Cornell University Ithaca, New York 14850	116, 117, 118, 120, 121, 123, 124, 126, 129
Department of Entomology Cornell University Ithaca, New York 14850	122, 125
Genetic Research Center Albert Einstein College of Medicine Bronx, New York 10461	128
Institute of Environmental Medicine New York University Medical Center New York, New York 10016	113
School of Arts State University of New York Stony Brook, New York 11790	127
School of Medicine and Dentistry University of Rochester Rochester, New York 14642	114
Upstate Medical Center State University of New York Syracuse, New York 13120	115
NORTH CAROLINA:	
Agricultural Experiment Station University of North Carolina Raleigh, North Carolina 27600	130
Department of Entomology North Carolina State University Raleigh, North Carolina 27600	131

PERFORMING ORGANIZATIONS (continued)

	Project Accession Numbers
OHIO	
Department of Animal Science Ohio Agricultural Research and Development Center Wooster, Ohio 44691	134
Ohio State University Columbus, Ohio 43210	132, 133
Department of Chemistry Ohio University Athens, Ohio 45701	135
OREGON:	
Oregon State University Corvallis, Oregon 97331	136, 137, 138, 139
PENNSYLVANIA:	
Agricultural Experiment Station Pennsylvania State University University Park, Pennsylvania 16802	140
Department of Anesthesia University of Pennsylvania Philadelphia, Pennsylvania 19104	142
School of Medicine University of Pennsylvania Philadelphia, Pennsylvania 19104	144
School of Veterinary Medicine University of Pennsylvania Philadelphia, Pennsylvania 19104	141, 143
SOUTH CAROLINA:	
Department of Animal Science Clemson University Clemson, South Carolina 29631	145
Department of Entomology and Economic Zoology Clemson University Clemson, South Carolina 29631	146

PERFORMING ORGANIZATIONS (continued)

	Project Accession Numbers
TENNESSEE:	
School of Medicine Vanderbilt University Nashville, Tennessee 37203	147
TEXAS:	
College of Veterinary Medicine Texas A & M University College Station, Texas 77843	148, 149, 150, 151, 152, 153
Department of Animal Science Texas A & M University College Station, Texas 77843	154
UTAH:	
Agricultural Experiment Station Utah State University Logan, Utah 84322	155
WASHINGTON:	
Agricultural Research Service Washington State University Pullman, Washington 99163	157, 158
Department of Veterinary Science Washington State University Pullman, Washington 99163	156, 159
School of Veterinary Medicine Washington State University Pullman, Washington 99163	160
WISCONSIN:	
Department of Meat and Animal Science University of Wisconsin Madison, Wisconsin 53706	164
Department of Veterinary Science University of Wisconsin Madison, Wisconsin 53706	161, 162, 165, 166

PERFORMING ORGANIZATIONS (continued)

Project Accession Numbers

WISCONSIN: (continued)

University of Wisconsin	163
Madison, Wisconsin 53706	

CANADA:

Animal Disease Research Institute	168, 170, 173,
Hull, Quebec, Canada	182

Animal Diseases Research Institute	167, 183, 184
Ottawa, Ontario K2H 8P9	

Ontario Veterinary College	169, 171, 172,
University of Guelph	174, 176, 177,
Guelph, Ontario, Canada	179, 180, 181,
	185, 186, 187,
	188, 190, 191,
	193

Sackville, New Brunswick	192
Canada	

Western College of Veterinary Medicine	175, 178
University of Saskatchewan	
Saskatoon, Canada S7N 0W0	

GRANTING AGENCIES

Project Accession Numbers

Alabama State Agricultural Experiment Station Auburn University, Auburn, Alabama 36830	002, 003
American Quarter Horse Association Box 200, Amarillo, Texas 79105	151
Arkansas State Agricultural Experiment Station University of Arkansas, Fayetteville, Arkansas 72701	004
California State Agricultural Experiment Station University of California, Davis, California 95616	008, 009, 016
California School of Veterinary Medicine University of California, Davis, California 95616	006, 007, 012, 014, 015, 017
Canada Department of Agriculture Animal Pathology Division, Health of Animals Branch P. O. Box 1400, Hull Quebec	168, 170, 173, 182
Canada Department of Agriculture Sackville, New Brunswick, Canada	192
Delaware Agricultural Experiment Station Newark, Delaware 19711	024
Florida State Agricultural Experiment Station University of Florida, Gainesville, Florida 32601	027, 029, 030, 032, 033, 034
Georgia State Agricultural Experiment Station University of Georgia, Athens, Georgia 30601	035, 036
Illinois State Agricultural Experiment Station University of Illinois, Urbana, Illinois 61801	038, 039, 040, 041
Indiana State Agricultural Experiment Station Purdue University, Lafayette, Indiana 47907	045, 046, 047, 049, 052, 055
Indiana College of Veterinary Medicine Purdue University, Lafayette, Indiana 47907	048, 050, 053
Kansas State Agricultural Experiment Station Kansas State University, Manhattan, Kansas 66504	059
Kansas College of Veterinary Medicine Kansas State University, Manhattan, Kansas 66504	060, 061, 062

GRANTING AGENCIES (continued)

Project Accession Numbers

Kentucky State Agricultural Experiment Station	063, 064, 065
University of Kentucky, Lexington, Kentucky 40506	066, 068, 070, 067, 071, 072, 073, 074
Louisiana State Agricultural Experiment Station	075, 076, 077,
Louisiana State University, Baton Rouge, Louisiana 70803	078, 081
Maryland State Agricultural Experiment Station	085, 086
University of Maryland, College Park, Maryland 20742	
Michigan State Agricultural Experiment Station	091, 095, 099
Michigan State University, E. Lansing, Michigan 48823	
Michigan College of Veterinary Medicine	089, 090, 092,
Michigan State University, E. Lansing, Michigan 48823	094, 096, 097, 098
Minnesota College of Veterinary Medicine	100, 101
University of Minnesota, St. Paul, Minnesota 55101	
Mississippi State Agricultural Experiment Station	104
State College, Mississippi 39762	
Missouri College of Veterinary Medicine	105, 106, 107,
University of Missouri, Columbia, Missouri 65201	108, 109, 110
Morris Animal Foundation	121
531 Guaranty Bank Building Denver, Colorado 80202	
New Jersey State Agricultural Experiment Station	112
Rutgers University, New Brunswick, New Jersey 08903	
New York College of Agriculture and Life Sciences	122, 125
Cornell University, Ithaca, New York 14850	
New York College of Veterinary Medicine	116, 117, 118,
Cornell University, Ithaca, New York 14850	120, 123, 126
North Carolina Agricultural Experiment Station	130
University of North Carolina, Raleigh, North Carolina 27600	
Ohio State Agricultural Experiment Station	034
Ohio State University, Columbus, Ohio 43210	
Ontario Ministry of Agriculture and Food	167, 182, 183,
Ontario, Canada	184

GRANTING AGENCIES (continued)

	Project Accession Numbers
Ontario Veterinary College University of Guelph, Guelph, Ontario, Canada	169, 171, 172, 174, 175, 177, 179, 180, 181, 185, 186, 187, 188, 190, 191, 193
Oregon State Agricultural Experiment Station Oregon State University, Corvallis, Oregon 97331	136, 137, 138 139
Pennsylvania Department of Agriculture Harrisburg, Pennsylvania 16802	140
Pennsylvania School of Veterinary Medicine University of Pennsylvania, Philadelphia, Penna. 19104	141, 143
Smithsonian Institution Museum of History and Technology, Washington, D. C. 20560	026
South Carolina Agricultural Experiment Station Clemson University, Clemson, South Carolina 29631	145, 146
Texas State Agricultural Experiment Station Texas A & M University, College Station, Texas 77843	148, 151, 153, 154
Texas College of Veterinary Medicine Texas A & M University, College Station, Texas 77843	149, 150, 152
U.S. Department of Agriculture, Agricultural Research Service, Washington, D. C. 20250	018, 019, 020, 021, 022, 023, 043, 056, 057, 151, 153, 079, 080, 083, 084, 087, 119, 157, 158
U. S. Department of Agriculture, Animal & Plant Health Inspection Service, Washington, D. C. 20250	058
U.S. Department of Health, Education, and Welfare National Institutes of Health, Bethesda, Maryland 20014	001, 011, 013, 128, 037, 044, 069, 088, 115, 124, 128, 129, 131, 132, 133, 135, 142, 147, 160, 163
U.S. Department of Interior National Park Service, Washington, D. C. 20240	005
U.S. National Science Foundation Division of Biological and Medical Sciences 1800 G Street, N.W., Washington, D. C. 20550	025, 111, 144
Utah State Agricultural Experiment Station Utah State University, Logan, Utah 84321	155

GRANTING AGENCIES (continued)

Project Accession Numbers

Washington College of Veterinary Medicine Washington State University, Pullman, Washington 99163	159
Washington State Agricultural Experiment Station Washington State University, Pullman, Washington 99163	156
Western College of Veterinary Medicine University of Saskatchewan Saskatoon, Canada S7N 0W0	175, 178, 189
Wisconsin Department of Veterinary Science University of Wisconsin, Madison, Wisconsin 53706	161, 162, 164, 165, 166

PURPOSES OF SELECTED GRANTING AGENCIES

AGRICULTURAL RESEARCH SERVICE

Provides the knowledge and technology so farmers can produce efficiently, conserve the environment, and meet the food and fiber needs of the American people. These aims are achieved through research in all areas related to agriculture; livestock and crop production, including diseases, insects, and other pests; agricultural engineering; soil and water conservation; marketing, including quality of products, transportation, and facilities; consumer and food economics, including appraisals of food, diet, and family economics; human nutrition; and new uses for farm products. Both basic and applied research is conducted in very close cooperation with the State agricultural experiment stations and related land-grant universities. ARS also cooperates with other research agencies in USDA, with other Federal agencies, with industry, foundations, and private groups. Research projects are also being conducted in several foreign countries with funds available through grants made under Public Law 480. In general, research projects related to the mission of the Agricultural Research Service are submitted to the Administrator of the Service at Washington, D. C.

GRAYSON FOUNDATION, INC.

The Grayson Foundation was established in 1940 with the objective of providing scientifically guided horse disease research. By working through established organizations such as colleges and universities, the Grayson Foundation has been able to use existing physical facilities in an effort to minimize the investment of Grayson funds in buildings and equipment. Its grants are intended primarily for use in funding laboratory materials and personnel.

MORRIS ANIMAL FOUNDATION

The Morris Animal Foundation, founded in 1948, is a publicly-supported foundation dedicated to improving the health of companion animals--horses, dogs, cats and zoo animals--through scientific research. It has funded more than 270 different projects at veterinary colleges into diseases and health problems of these animals. In addition to projects, the Foundation sponsors seminars as a means of educating horse owners and breeders about equine health. Current scientific projects include an investigation of the factors affecting the circulation of the forefoot and their relationship to laminitis, an examination of mare-foal interaction and the herd dominance system, a study of artificial insemination as a possible breeding tool, an investigation of equine adenoviral infection, and a study of the utero-ovarian relationship in the mare. Other

studies have probed such health problems as stress, nutrition, shock, parasites and swamp fever. Current emphasis is on colic, laminitis and reproduction.

Projects are conducted at colleges of veterinary medicine by researchers whose proposals received high scores from the Foundation's Advisory Board of top scientists, who serve as volunteers. Because most Foundation personnel are volunteers, and because administrative expenses are budgeted out of a separate operating fund, all earmarked contributions for research are used solely for that purpose.

The Foundation, whose office is located at 531 Guaranty Bank Building, Denver, Colorado, is tax exempt under Section 170(b)(1)(A)(VI) as an organization that normally receives a substantial part of its income from the general public. Requests for information about proposals are welcome.

NATIONAL INSTITUTES OF HEALTH

The National Institutes of Health provides leadership and direction to programs designed to improve the health of the people of the United States through the following activities: (1) Conducts and supports research in the causes, diagnosis, prevention, and cure of diseases of man, in the processes of human growth and development, in the biological effects of environmental contaminants, and in related sciences, and supports the training of research personnel and construction of research facilities, and the development of other research resources; (2) Directs programs for the collection, dissemination, and exchange of information in medicine and health, including the development and support of medical libraries and the training of medical librarians and other health information specialists.

NATIONAL PARK SERVICE

The public use, protection, development, interpretation, and management of the natural and clutural resources of a natural area shall be predicated on documented data obtained through appropriate investigation and research. Moreover, the use of the resources in natural areas for study or research purposes by recognized educational and scientific institutions and accredited individuals shall be encouraged. Pursuant to the achievement of these policies, the collection of reasonable numbers of biological and geological specimens and historic artifacts and objects may be permitted. All research should be consonance with the purposes of the park and the policies of the Service. Procedures that might result in damage or alteration to Class IV areas will not be permitted. Care should be taken to avoid excessive disturbance or harassment of wildlife and aquatic life. In no case will harassment of rare and endangered species be permitted, and undue disturbance thereof must be avoided.

STATE AGRICULTURAL EXPERIMENT STATIONS

Promote efficient agricultural production, marketing, utilization and distribution of farm products through approved projects and as performers of research. Conduct original and other investigations and experiments bearing directly on and contributing to the establishment and maintenance of a permanent and effective agricultural industry in the United States, Puerto Rico, Guam, and Virgin Islands. Supported investigations have for their purpose the development and improvement of the rural home and rural life and the maximum contribution by agriculture to the welfare of the consumer, and have identifiable relationships to the varying conditions and needs of the respective States. Funds are provided by the State, Federal Hatch Act (PL-352 amended) and other public and private sources. The Federal Hatch Act funds are distributed to the Director of the respective State agricultural experiment station by a formula through the Cooperative State Research Service. Project proposals are submitted to the Director of the agricultural experiment station in the respective State.

KEYWORD IN CONTEXT

ABDOMINAL SURGERY	STAPLE SUTURING TECHNIQUES FOR EQUINE	094
ABNORMALITIES OF ANIMALS	MUSCULO-SKELETAL	155
ABORTION IN MARES	INFERTILITY-AN INVESTIGATION OF THE CAUSES OF	182
ACID ON SYNOVIAL FLUID FROM ARTHRITIC MUSCLES	EFFECTS OF MECLOFENAMIC	089
ACTION OF HORSE SERUM CHOLINESTERASE	MECHANISMS OF PESTICIDE	131
ACUTE BACTERIAL HEPATITIS OF FOALS	ETIOLOGY PATHOGENESIS AND EPIZOOTIOLOGY OF	073
ACUTE EQUINE LAMINITIS	PHARMACOLOGIC CHARACTERIZATION OF	108
ADAPTATION BY ANIMALS IN DESERT AND MOUNTAIN		111
ADAPTATION IN CUTANEOUS BACTERIA	GENETIC MECHANISMS OF	130
AEROSOLS IN PULMONARY FUNCTION PARTICLE DEPOSITION BRONCHIAL CLEARANCES	SULFATE	113
AERUGINOSA IN HORSES	HEMOLYSINS OF STAPHYLOCOCCI AND PSEUDOMONAS	069
AGAINST GASTROPHILUS SPP. IN PONIES	TRICHLORFEN PASTE ORAL FORMULATION	002
AGAINST INTERNAL PARASITES	BIOLOGICAL PROTECTION OF LIVESTOCK	137
AGENT FOR EQUINE ANESTHESIA	USE OF CI-744 AS AN INDUCTIONAL	090
AIRWAY RESISTANCE IN UPPER AND LOWER RESPIRATORY TRACT	PARTITIONING OF	098
AIRWAYS RESISTANCE IN HORSES	NON-INVASIVE MEASUREMENT OF	132
ALIMENTARY LAMINITIS COAGULATION PROFILES IN HORSES WITH EXPERIMENTALLY INDUCED		103
ALIMENTATION FOR THE EQUINE SURGICAL PATIENT	INTRAVENOUS	093
ALTERNATIVES FOR HORSES	RATION	136
ANAESTHETIC POTENCY AND TOXICOLOGY		017
ANEMIA	EQUINE INFECTIOUS	116
ANEMIA	STUDY OF EQUINE INFECTIOUS	168
ANEMIA	DIAGNOSIS OF EQUINE INFECTIOUS	151
ANEMIA	DIAGNOSIS OF EQUINE INFECTIOUS	159
ANEMIA	EPIDEMIOLOGY DIAGNOSIS AND CONTROL OF EQUINE INFECTIOUS	080
ANEMIA DIAGNOSIS TRANSMISSION EPIDEMIOLOGY AND CONTROL	EQUINE INFECTIOUS	079
ANESTHESIA	USE OF CI-744 AS AN INDUCTIONAL AGENT FOR EQUINE	090
ANESTHESIA IN HORSE	PULMONARY INSUFFICIENCY DURING	142
ANHYDRASES IN HUMANS HORSES CATTLE AND GOATS	BLOOD CARBONIC	163
ANION TRANSPORT MECHANISMS	HEPATIC ORGANIC	028
ANTERIOR PITUITARY HORMONES	STUDIES ON	037
ANTHELMINTICS FOR DOMESTICATED ANIMALS AND POULTRY	EVALUATE NEW	083
ANTIBODIES	IMMUNOCHEMICAL STUDIES ON EQUINE	114
ANTIGENIC VARIATIONS AND VIRUS RESERVOIRS IN BIRDS	MYXOVIRUS INFLUENZA A-EQUI	074
ARBOVIRUS DISEASES	EPIDEMIOLOGY OF VENEZUELAN EQUINE ENCEPHALITIS-RELATED	153
ARBOVIRUSES	WILDLIFE RESERVOIRS OF	166
AREA CALIF AND ARIZ	FERAL BURROS AND FORAGE PRODUCTION IN THE HAVASU RESOURCE	005
ARIZ	FERAL BURROS AND FORAGE PRODUCTION IN THE HAVASU RESOURCE AREA CALIF AND	005
ARTERIOGRAPHY IN STRONGYLUS VULGARIS INFECTION IN		191
ARTHRITIC MUSCLES	EFFECTS OF MECLOFENAMIC ACID ON SYNOVIAL FLUID FROM	089
ARTICULAR REPAIR IN HORSES	ENHANCEMENT OF	115
AVASCULAR NECROSIS OF THE EQUINE THIRD AND CENTRAL TARSAL BONES		186

KEYWORD IN CONTEXT (continued)

BACTERIA	GENETIC MECHANISMS OF ADAPTATION IN CUTANEOUS	130
BACTERIAL HEPATITIS OF FOALS	ETIOLOGY PATHOGENESIS AND EPIZOOTIOLOGY OF ACUTE	073
BALANITIS	STUDY ON THE VIRUSES OF EQUINE RHINOPNEUMONITIS AND EQUINE VULVITIS	173
BASIS OF MUSCLE DISEASES BIRDS MAMMALS	PATHOPHYSIOLOGICAL	013
BEHAVIOR	AN INVESTIGATION OF EQUINE DOMINANCE AND MATERNAL	121
BEHAVIOR IN THE EQUINE	FACTORS AFFECTING ENERGY UTILIZATION AND FEEDING	064
BINDING CAPACITY AND LIFESPAN IN THE NORMAL HORSE	ERYTHROCYTE METABOLISM	176
BIO-MECHANICAL MODELING OF LAMENESS		144
BIO-MECHANICAL MODELING OF LAMENESS IN RACEHORSES		025
BIOCHEMISTRY OF MILKS OF VARIOUS MAMMALS-HORSES	COMPARATIVE	101
BIOLOGICAL AND DISTRIBUTIONAL STUDIES ON HORSE FLIES AND DEER FLIES	TAXONOMIC	125
BIOLOGICAL CHARACTERISTICS OF FETAL IMMUNE GLOBULINS	PHYSICAL AND	043
BIOLOGICAL PROTECTION OF LIVESTOCK AGAINST INTERNAL PARASITES		137
BIOLOGY AND CONTROL OF ECTOPARASITES AND FLIES AFFECTING LIVESTOCK AND POULTRY		122
BIOLOGY OF BOT FLIES		024
BIOLOGY OF PARASITES IN DOMESTIC ANIMALS	DISTRIBUTION AND	146
BIOCHEMICAL INTERACTIONS OF SELENIUM	NUTRITIONAL AND	138
BIOCHEMICAL INTERACTIONS OF SELENIUM	INTERACTIONS OF TOXIC METAL SPECIES WITH	044
BIRDS	MYXOVIRUS INFLUENZA A-EQUI ANTIGENIC VARIATIONS AND VIRUS RESERVOIRS IN	074
BIRDS MAMMALS	PATHOPHYSIOLOGICAL BASIS OF MUSCLE DISEASES	013
BLOOD	DETECTION OF HEPATITIS IN	011
BLOOD AND MAMMARY SECRETIONS	SOLUBLE PROTEINS OF EQUINE	071
BLOOD CARBONIC ANHYDRASES IN HUMANS HORSES CATTLE AND GOATS		163
BONE CEMENT	STABILIZATION OF THE EQUINE CERVICAL SPINE USING	188
BONE DISEASES OF ANIMALS	METABOLIC AND CONGENITAL	049
BONES	AVASCULAR NECROSIS OF THE EQUINE THIRD AND CENTRAL TARSAL	186
BOT FLIES	BIOLOGY OF	024
BREATHING IN NEWBORN FOALS	PULMONARY MECHANICS AND MECHANICAL CONTROL OF	010
BREEDER-OWNER IN MARYLAND HORSE INDUSTRY	ANALYSIS OF COSTS AND RETURNS TO	085
BRONCHIAL CLEARANCES	SULFATE AEROSOLS IN PULMONARY FUNCTION PARTICLE DEPOSITION	113
BRONCHIAL LAVAGE SAMPLING TECHNIQUES	CHRONIC RESPIRATORY DISEASES	100
BURROS AND FORAGE PRODUCTION IN THE HAVASU RESOURCE AREA CALIF AND ARIZ	FERAL	005
CALCIUM AND PHOSPHORUS UTILIZATION IN THE EQUINE	DIETARY FACTORS AFFECTING	063
CALIF AND ARIZ	FERAL BURROS AND FORAGE PRODUCTION IN THE HAVASU RESOURCE AREA	005
CAPACITY AND LIFESPAN IN THE NORMAL HORSE	ERYTHROCYTE METABOLISM BINDING	176
CARBONIC ANHYDRASES IN HUMANS HORSES CATTLE AND GOATS	BLOOD	163
CARDIOPULMONARY FUNCTION IN EQUINE COLIC		180
CARDIOVASCULAR DYNAMICS OF LAMINITIS AND SHOCK	ENDOCRINE AND	106
CATTLE AND GOATS	BLOOD CARBONIC ANHYDRASES IN HUMANS HORSES	163
CECAL DIGESTION IN EQUINES		134
CELL APPROACH IN GENETIC ANALYSIS OF EQUINES	SCHEMATIC	128
CELL INTERACTIONS AND INTERFERON IN EQUINE INFECTIOUS DISEASES	VIRUS-HOST	029
CEMENT	STABILIZATION OF THE EQUINE CERVICAL SPINE USING BONE	188

KEYWORD IN CONTEXT (continued)

CERVICAL SPINE USING BONE CEMENT	STABILIZATION OF THE EQUINE	188
CHEMICAL TRANSFORMATION	ENZYME STRUCTURE AND FUNCTION MECHANISM AND	009
CHEMORECEPTORS AND VENTILATORY CONTROL		161
CHOLINESTERASE	MECHANISMS OF PESTICIDE ACTION OF HORSE SERUM	131
CHROMOSOMES	STRUCTURE AND RELEASE MODE OF MATURE HORSE SPERM	135
CHRONIC DIARRHEA IN THE HORSE	PATHOPHYSIOLOGY OF	143
CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN HORSES		075
CHRONIC RESPIRATORY DISEASES BRONCHIAL LAVAGE SAMPLING TECHNIQUES		100
CHRONIC WEIGHT LOSS OF HORSES		169
CIRCULATION OF THE FOREFOOT OF THE HORSE AND RELATIONSHIP TO ETIOLOGY LAMINITIS		097
CLEARANCES SULFATE AEROSOLS IN PULMONARY FUNCTION PARTICLE DEPOSITION BRONCHIAL		113
COAGULATION PROFILES IN HORSES WITH EXPERIMENTALLY INDUCED ALIMENTARY LAMINITIS		103
COLIC	CARDIOPULMONARY FUNCTION IN EQUINE	180
COLLATERAL VENTILATION	DEVELOPMENT OF	096
COMBINED IMMUNODEFICIENCY DISEASE IN HORSES	GENETIC STUDIES OF	014
COMBINED IMMUNODEFICIENCY IN FOALS		160
COMMERCIAL MODIFIED LIVE RHINOPNEUMONITIS VIRUS VACCINE	STUDIES ON A	183
COMPARATIVE BIOCHEMISTRY OF MILKS OF VARIOUS MAMMALS-HORSES		101
COMPARATIVE STUDIES OF LARGE INTESTINAL FUNCTION		129
COMPARISON OF PENIS PRESSURES AND MYOGRAPHY IN INTRACMISSION		001
COMPETENCE	RESPIRATORY DISEASE IN RELATION IMMUNE	006
CONCEPTION RATE AND FOAL DEVELOPMENT IN QUARTER HORSES	INCREASING	104
CONFORMATION STUDIES ON MODIFIED HEMOGLOBINS OF THE HORSE		127
CONGENITAL BONE DISEASES OF ANIMALS	METABOLIC AND	049
COPPER AS CAUSES OF DISEASE IN ANIMALS	ENVIRONMENTAL TOXINS INCLUDING	053
CORONARY VESSELS	WALL SHEAR STRESSES IN EQUINE	133
CORPUS LUTEUM IN MAMMALS	CONTROL OF THE	165
COSTS AND RETURNS TO BREEDER-OWNER IN MARYLAND HORSE INDUSTRY	ANALYSIS OF	085
CULTURES OF THE SOUTHWEST	INFLUENCES OF HORSES ON MATERIALS	026
CUTANECUS BACTERIA	GENETIC MECHANISMS OF ADAPTATION IN	130
DEER FLIES	TAXONOMIC BIOLOGICAL AND DISTRIBUTIONAL STUDIES ON HORSE FLIES AND	125
DEPOSITION BRONCHIAL CLEARANCES	SULFATE AEROSOLS IN PULMONARY FUNCTION PARTICLE	113
DESERT AND MOUNTAIN	ADAPTATION BY ANIMALS IN	111
DETECTION OF HEPATITIS IN BLOOD		011
DIAGNOSIS AND CONTROL OF EQUINE INFECTIOUS ANEMIA	EPIDEMIOLOGY	080
DIAGNOSIS AND IMMUNIZATION STRONGYLLS VULGARIS	INTERNAL PARASITES OF HORSES	076
DIAGNOSIS OF EQUINE INFECTIOUS ANEMIA		151
DIAGNOSIS OF EQUINE INFECTIOUS ANEMIA		159
DIAGNOSIS OF FOREIGN ANIMAL DISEASES	PREPAREDNESS FOR LABORATORY ASSISTANCE IN	119
DIAGNOSIS TRANSMISSION EPIDEMIOLOGY AND CONTROL	EQUINE INFECTIOUS ANEMIA	079
DIARRHEA IN THE HORSE	PATHOPHYSIOLOGY OF CHRONIC	143
DIETARY FACTORS AFFECTING CALCIUM AND PHOSPHORUS UTILIZATION IN THE EQUINE		063
DIGESTION IN EQUINES	CECAL	134

KEYWORD IN CONTEXT (continued)

DIGESTION IN THE HORSE	PHYSIOLOGY OF	031
DISTRIBUTION AND BIOLOGY OF PARASITES IN DOMESTIC ANIMALS		146
DISTRIBUTIONAL STUDIES ON HORSE FLIES AND DEER FLIES	TAXONOMIC BIOLOGICAL AND	125
DOMINANCE AND MATERNAL BEHAVIOR	AN INVESTIGATION OF EQUINE	121
DRUG EQUINE RESEARCH		105
DRUG RESEARCH PROGRAM	EQUINE	123
DRUGS USED ILLEGITIMATELY IN RACEHORSES	IDENTIFICATION OF	081
DUE TO GENETIC DISEASES	REDUCING PERINATAL LOSSES IN LIVESTOCK	060
DURING ANESTHESIA IN HORSE	PULMONARY INSUFFICIENCY	142
DYNAMICS OF LAMINITIS AND SHOCK	ENDOCRINE AND CARDIOVASCULAR	106
ECTOPARASITES AND FLIES AFFECTING LIVESTOCK AND POULTRY	BIOLOGY AND CONTROL OF	122
EFFICIENCY OF REPRODUCTION IN THE MARE	IMPROVING	078
ELECTROCARDIOGRAM OF THE STANDARD-BRED HORSE		171
ELECTROLYTES	EXERCISE TRAINING AND SERUM	007
EMBRYOGENESIS IN MAMMALS	FACTORS AFFECTING	042
EMBRYONIC MORTALITY	MARE IMMUNOPREGNANCY TEST FOR DETECTING EARLY	149
ENCEPHALITIDES	SURVEILLANCE OF TROPICAL DISEASES INCLUDING EQUINE VIRAL	082
ENCEPHALITIS ANIMAL AND INSECT VECTORS	VENEZUELAN EQUINE	018
ENCEPHALITIS RESERVOIR POTENTIAL OF DOMESTIC ANIMALS		150
ENCEPHALITIS VIRUS BY HOST PASSAGE	VIRULENCE OF VENEZUELAN EQUINE	023
ENCEPHALITIS VIRUSES	PATHOGENESIS AND IMMUNOGENESIS OF EQUINE	020
ENCEPHALITIS-RELATED ARBOVIRUS DISEASES	EPIDEMIOLOGY OF VENEZUELAN EQUINE	153
ENDOCRINE AND CARDIOVASCULAR DYNAMICS OF LAMINITIS AND SHOCK		106
ENDOPARASITE TRANSMISSION OF INFECTIOUS DISEASES		158
ENERGY UTILIZATION AND FEEDING BEHAVIOR IN THE EQUINE	FACTORS AFFECTING	064
ENHANCEMENT OF ARTICULAR REPAIR IN HORSES		115
ENVIRONMENTAL TOXINS INCLUDING COPPER AS CAUSES OF DISEASE IN ANIMALS		053
ENZYME STRUCTURE AND FUNCTION MECHANISM AND CHEMICAL TRANSFORMATION		009
ENZYMOPATHIES IN ANIMALS	ERYTHROCYTE	062
EPIDEMIOLOGY AND CONTROL	EQUINE INFECTIOUS ANEMIA DIAGNOSIS TRANSMISSION	079
EPIDEMIOLOGY DIAGNOSIS AND CONTROL OF EQUINE INFECTIOUS ANEMIA		080
EPIDEMIOLOGY OF VENEZUELAN EQUINE ENCEPHALITIS-RELATED ARBOVIRUS DISEASES		153
EPISTAXIS RESEARCH	EQUINE	109
EPIZOOTIOLOGY OF ACUTE BACTERIAL HEPATITIS OF FOALS	ETIOLOGY PATHOGENESIS AND	073
EQUINE ANTIGENIC VARIATIONS AND VIRUS RESERVOIRS IN BIRDS	MYXOVIRUS INFLUENZA A	074
EQUIPERDUM	STUDIES OF TRYPANOSOMA	170
ERYTHROCYTE ENZYMOLOGIES IN ANIMALS		062
ERYTHROCYTE METABOLISM BINDING CAPACITY AND LIFESPAN IN THE NORMAL HORSE		176
ESTRUS ONSET AND OVULATION IN MARES	CONTROL	032
ETIOLOGY LAMINITIS CIRCULATION OF THE FOREFOOT OF THE HORSE AND RELATIONSHIP TO		097
ETIOLOGY PATHOGENESIS AND EPIDEMIOLOGY OF ACUTE BACTERIAL HEPATITIS OF FOALS		073
EVALUATE NEW ANTHELMINTICS FOR DOMESTICATED ANIMALS AND POULTRY		083
EVENTS AT OVULATION	MECHANISMS CONTROLLING SEQUENCE OF	040

KEYWORD IN CONTEXT (continued)

EXERCISE TRAINING AND SERUM ELECTROLYTES	007
EXTRARENAL HEMODYNAMICS IN HORSES	EFFECTS OF FUROSEMIDE ON 110
FATIGUE IN HORSES	EFFECTS OF VITAMIN-E ON 112
FEEDING BEHAVIOR IN THE EQUINE	FACTORS AFFECTING ENERGY UTILIZATION AND 064
FEEDING THE IMMATURE HORSE	154
FERAL BURROS AND FORAGE PRODUCTION IN THE HAVASU RESOURCE AREA CALIF AND ARIZ	005
FERTILITY IN MARE UTILIZING SYNTHETIC LUTEINIZING HORMONE	OVULATION AND 184
FETAL IMMUNO GLOBULINS	PHYSICAL AND BIOLOGICAL CHARACTERISTICS OF 043
FETAL IMMUNOGLOBULINS FROM IN UTERO VACCINE VIRUS	EQUINE 022
FETAL MORTALITY IN COWS MARES AND SOWS	INVESTIGATION OF 167
FETUS IN HORMONAL REGULATION OF GESTATION IN THE HORSE	ROLE OF THE 190
FETUSES FOALS AND MATURE HORSES	PROSPECTIVE VIROLOGIC STUDY OF EQUINE 070
FEVER IN EQUINE	SWAMP 057
FLIES	BIOLOGY OF BOT 024
FLIES TAXONOMIC BIOLOGICAL AND DISTRIBUTIONAL STUDIES ON HORSE FLIES AND DEER	125
FLIES AFFECTING LIVESTOCK AND POULTRY	BIOLOGY AND CONTROL OF ECTOPARASITES AND 122
FLIES AND DEER FLIES TAXONOMIC BIOLOGICAL AND DISTRIBUTIONAL STUDIES ON HORSE	125
FLUID FROM ARTHRITIC MUSCLES	EFFECTS OF MECLIZEMIC ACID ON SYNOVIAL 089
FOAL DEVELOPMENT IN QUARTER HORSES	INCREASING CONCEPTION RATE AND 104
FOALS	COMBINED IMMUNODEFICIENCY IN 160
FOALS	PRIMARY IMMUNODEFICIENCY DISEASES IN 102
FOALS PULMONARY MECHANICS AND MECHANICAL CONTROL OF BREATHING IN NEWBORN	010
FOALS ETIOLOGY PATHOGENESIS AND EPIZOOTIOLOGY OF ACUTE BACTERIAL HEPATITIS OF	073
FOALS AND MATURE HORSES	PROSPECTIVE VIROLOGIC STUDY OF EQUINE FETUSES 070
FOALS IN OVERO HORSES	LETHAL WHITE 015
FOOD DISEASES	MYCOTOXINS AND MOLDY 147
FORAGE PRODUCTION IN THE HAVASU RESOURCE AREA CALIF AND ARIZ	FERAL BURROS AND 005
FOREFOOT OF THE HORSE AND RELATIONSHIP TO ETIOLOGY LAMINITIS	CIRCULATION OF THE 097
FOREIGN ANIMAL DISEASES PREPAREDNESS FOR LABORATORY ASSISTANCE IN DIAGNOSIS OF	119
FORMULATION AGAINST GASTROPHILUS SPP. IN PONIES	TRICHLORFON PASTE ORAL 002
FUROSEMIDE ON EXTRARENAL HEMODYNAMICS IN HORSES	EFFECTS OF 110
FUSION SITES	EQUINE OSSIFICATION AND 178
GASTROINTESTINAL PARASITES	IDENTIFICATION AND CONTROL OF THE MAJOR 027
GASTROPHILUS SPP. IN PONIES	TRICHLORFON PASTE ORAL FORMULATION AGAINST 002
GENETIC ANALYSIS OF EQUINES	SCMATIC CELL APPROACH IN 128
GENETIC DISEASES	REDUCING PERINATAL LOSSES IN LIVESTOCK DUE TO 060
GENETIC MECHANISMS OF ADAPTATION IN CUTANEOUS BACTERIA	130
GENETIC STUDIES OF COMBINED IMMUNODEFICIENCY DISEASE IN HORSES	014
GENOME AND VIRION OF TOGAVIRUSES	PHYSICOCHEMICAL CHARACTERIZATION OF 019
GESTATION IN THE HORSE	ROLE OF THE FETUS IN HORMONAL REGULATION OF 190
GLOBULINS	PHYSICAL AND BIOLOGICAL CHARACTERISTICS OF FETAL IMMUNO 043
GOATS AND MOSQUITOES	TRANSMISSION OF VIRUS DISEASES BY 021
GOATS	BLOOD CARBONIC ANHYDRASES IN HUMANS HORSES CATTLE AND 163

KEYWORD IN CONTEXT (continued)

GROWTH AND DEVELOPMENT	EQUINE	047
GROWTH AND DEVELOPMENT OF THE YOUNG HORSE	NUTRIENT REQUIREMENTS FOR OPTIMUM	030
GROWTH AND PRODUCTIVITY	NUTRITIONAL FACTORS INFLUENCING EQUINE	038
HAVASU RESOURCE AREA CALIF AND ARIZ	FERAL BURROS AND FORAGE PRODUCTION IN THE	005
HEALTH OF HUMANS AND ANIMALS	HELMINTHS AND OTHER PARASITES IMPORTANT TO	087
HELMINTH PARASITES OF DOMESTIC LIVESTOCK		046
HELMINTHS	STUDIES ON EQUINE	192
HELMINTHS AND OTHER PARASITES IMPORTANT TO HEALTH OF HUMANS AND ANIMALS		087
HEMATOLOGIC DISEASES OF DOMESTIC ANIMALS		051
HEMES	OXYGEN TRANSPORT OF HORSE HEMOGLOBINS WITH MODIFIED	124
HEMODYNAMICS IN HORSES	EFFECTS OF FURCEMIDE ON EXTRARENAL	110
HEMOGLOBINS OF THE HORSE	CONFORMATION STUDIES ON MODIFIED	127
HEMOGLOBINS WITH MODIFIED HEMES	OXYGEN TRANSPORT OF HORSE	124
HEMOLYSINS OF STAPHYLOCCI AND PSEUDOMONAS AERUGINOSA IN HORSES		069
HEPATIC ORGANIC ANION TRANSPORT MECHANISMS		028
HEPATITIS	EQUINE SERUM	012
HEPATITIS IN BLOOD	DETECTION OF	011
HEPATITIS OF FOALS	ETIOLOGY PATHOGENESIS AND EPIZOOTIOLOGY OF ACUTE BACTERIAL	073
HERPESVIRUSES	PATHOGENESIS OF DISEASE INDUCED BY EQUINE	067
HORMONAL CONTROL OF OVULATION IN ANIMALS		091
HORMONAL REGULATION OF GESTATION IN THE HORSE	ROLE OF THE FETUS IN	190
HORMONE	OVULATION AND FERTILITY IN MARE UTILIZING SYNTHETIC LUTEINIZING	164
HORMONES	STUDIES ON ANTERIOR PITUITARY	037
HORMONES IN MARES	QUANTITATION OF HYPOPHYSEAL AND OVARIAN	072
HOST CELL INTERACTIONS AND INTERFERON IN EQUINE INFECTIOUS DISEASES	VIRUS	029
HOST PASSAGE	VIRULENCE OF VENEZUELAN EQUINE ENCEPHALITIS VIRUS BY	023
HUMANS AND ANIMALS	HELMINTHS AND OTHER PARASITES IMPORTANT TO HEALTH OF	087
HUMANS HORSES CATTLE AND GOATS	BLOOD CARBONIC ANHYDRASES IN	163
HYPERLIPEMIA IN HORSES	HYPERNATREMIA AND	181
HYPERSENSITIVITY IN THE HORSE	VASOACTIVE MEDIATORS OF PULMONARY	172
HYPERNATREMIA AND HYPERLIPEMIA IN HORSES		181
HYPOPHYSEAL AND OVARIAN HORMONES IN MARES	QUANTITATION OF	072
ILLICITLY IN RACEHORSES	IDENTIFICATION OF DRUGS USED	081
IMMATURE HORSE	FEEDING THE	154
IMMUNE COMPETENCE	RESPIRATORY DISEASE IN RELATION	006
IMMUNE RESPONSE OF THE HORSE		052
IMMUNIZATION STRONGYLUS VULGARIS	INTERNAL PARASITES OF HORSES DIAGNOSIS AND	076
IMMUNOGLOBULINS	PHYSICAL AND BIOLOGICAL CHARACTERISTICS OF FETAL	043
IMMUNOCHEMICAL STUDIES ON EQUINE ANTIBODIES		114
IMMUNODEFICIENCY DISEASE IN HORSES	GENETIC STUDIES OF COMBINED	014
IMMUNODEFICIENCY DISEASES IN FOALS	PRIMARY	102
IMMUNODEFICIENCY IN FOALS	COMBINED	160
IMMUNOGENESIS OF EQUINE ENCEPHALITIS VIRUSES	PATHOGENESIS AND	020

KEYWORD IN CONTEXT (continued)

IMMUNOGLOBULINS FROM IN UTERO VACCINE VIRUS	EQUINE FETAL	022
IMMUNOGLOBULINS OF DOMESTIC ANIMALS	PROPERTIES OF	048
IMMUNOLOGY AND INFECTIOUS DISEASES	EQUINE	156
IMMUNOPREGNANCY TEST FOR DETECTING EARLY EMBRYONIC MORTALITY	MARE	149
IMPROVING EFFICIENCY OF REPRODUCTION IN THE MARE		078
INAPPARENT VIRAL INFECTIONS		050
INCREASING CONCEPTION RATE AND FOAL DEVELOPMENT IN QUARTER HORSES		104
INDUCED ALIMENTARY LAMINITIS COAGULATION PROFILES IN HORSES WITH EXPERIMENTALLY		103
INDUCED BY EQUINE HERPESVIRUSES	PATHOGENESIS OF DISEASE	067
INDUCTIONAL AGENT FOR EQUINE ANESTHESIA	USE OF CI-744 AS AN	090
INDUSTRY	MARKET ANALYSIS OF THE MARYLAND HORSE	086
INDUSTRY ANALYSIS OF COSTS AND RETURNS TO BREEDER-OWNER IN MARYLAND HORSE		085
INFECTION IN	ARTERIOGRAPHY IN STRONGYLUS VULGARIS	191
INFECTION MODELS EQUINE	SLOW VIRUS	152
INFECTIONS	INAPPARENT VIRAL	050
INFECTIOUS ANEMIA	EQUINE	116
INFECTIOUS ANEMIA	STUDY OF EQUINE	168
INFECTIOUS ANEMIA	DIAGNOSIS OF EQUINE	151
INFECTIOUS ANEMIA	DIAGNOSIS OF EQUINE	159
INFECTIOUS ANEMIA	EPIDEMIOLOGY DIAGNOSIS AND CONTROL OF EQUINE	080
INFECTIOUS ANEMIA DIAGNOSIS TRANSMISSION EPIDEMIOLOGY AND CONTROL	EQUINE	079
INFECTIOUS DISEASES	EQUINE	117
INFECTIOUS DISEASES	EQUINE IMMUNOLOGY AND	156
INFECTIOUS DISEASES	ENDOPARASITE TRANSMISSION OF	158
INFECTIOUS DISEASES	VIRUS-HOST CELL INTERACTIONS AND INTERFERON IN EQUINE	029
INFERTILITY-AN INVESTIGATION OF THE CAUSES OF ABORTION IN MARES		182
INFLUENCES OF HORSES ON MATERIALS CULTURES OF THE SOUTHWEST		026
INFLUENZA A-EQUI ANTIGENIC VARIATIONS AND VIRUS RESERVOIRS IN BIRDS	MYXOVIRUS	074
INFLUENZA VACCINE	EQUINE	058
INHIBITORS	MAMMALIAN SPERM PROTEINASES AND THEIR NATURAL	041
INSECT VECTORS	VENEZUELAN EQUINE ENCEPHALITIS ANIMAL AND	018
INSUFFICIENCY DURING ANESTHESIA IN HORSE	PULMONARY	142
INTERACTIONS AND INTERFERON IN EQUINE INFECTIOUS DISEASES	VIRUS-HOST CELL	029
INTERACTIONS OF SELENIUM	NUTRITIONAL AND BIOMEDICAL	138
INTERACTIONS OF TOXIC METAL SPECIES WITH BIOMOLECULES		044
INTERFERON IN EQUINE INFECTIOUS DISEASES	VIRUS-HOST CELL INTERACTIONS AND	029
INTERNAL PARASITES	BIOLOGICAL PROTECTION OF LIVESTOCK AGAINST	137
INTERNAL PARASITES OF HORSES DIAGNOSIS AND IMMUNIZATION STRONGYLUS VULGARIS		076
INTERNAL PARASITES OF THE HORSE	CONTROLLING	068
INTERRELATIONSHIPS	NUTRIENT REQUIREMENTS AND	045
INTESTINAL FUNCTION	COMPARATIVE STUDIES OF LARGE	129
INTRAVENOUS ALIMENTATION FOR THE EQUINE SURGICAL PATIENT		093
INTROMISSION	COMPARISON OF PENIS PRESSURES AND MYOGRAPHY IN	001

KEYWORD IN CONTEXT (continued)

INVASIVE MEASUREMENT OF AIRWAYS RESISTANCE IN HORSES	NCN	132
LABORATORY ASSISTANCE IN DIAGNOSIS OF FOREIGN ANIMAL DISEASES	PREPAREDNESS FOR	119
LAMENESS	EQUINE	107
LAMENESS	BIO-MECHANICAL MODELING OF	144
LAMENESS IN RACEHORSES	BIO-MECHANICAL MODELING OF	025
LAMINITIS	PHARMACOLOGIC CHARACTERIZATION OF ACUTE EQUINE	108
LAMINITIS	CIRCULATION OF THE FOREFOOT OF THE HORSE AND RELATIONSHIP TO ETIOLOGY	097
LAMINITIS	COAGULATION PROFILES IN HORSES WITH EXPERIMENTALLY INDUCED ALIMENTARY	103
LAMINITIS AND SHOCK	ENDOCRINE AND CARDIOVASCULAR DYNAMICS OF	106
LARGE ANIMALS	DISEASES AND THERAPEUTICS OF	148
LARGE INTESTINAL FUNCTION	COMPARATIVE STUDIES OF	129
LAVAGE SAMPLING TECHNIQUES	CHRONIC RESPIRATORY DISEASES BRONCHIAL	100
LEAD TOXICITY IN HORSES		092
LETHAL WHITE FOALS IN OVERO HORSES		015
LEUKEMIA IN THE HORSE	STUDIES ON	141
LIFESPAN IN THE NORMAL HORSE	ERYTHROCYTE METABOLISM BINDING CAPACITY AND	176
LIGHT HORSE	NUTRIENT REQUIREMENTS OF THE	120
LIGHT ON EQUINE METABOLISM	EFFECTS OF	008
LIMB SKELETAL DISEASE IN LOUISIANA RACING THOROUGHBREDS	LOWER	077
LIVE RHINOPNEUMONITIS VIRUS VACCINE	STUDIES ON A COMMERCIAL MODIFIED	183
LIVESTOCK	HELMINTH PARASITES OF DOMESTIC	046
LIVESTOCK AGAINST INTERNAL PARASITES	BIOLOGICAL PROTECTION OF	137
LIVESTOCK AND POULTRY	BIOLOGY AND CONTROL OF ECTOPARASITES AND FLIES AFFECTING	122
LIVESTOCK DUE TO GENETIC DISEASES	REDUCING PERINATAL LOSSES IN	060
LOSS OF HORSES	CHRONIC WEIGHT	169
LOSSES IN LIVESTOCK DUE TO GENETIC DISEASES	REDUCING PERINATAL	060
LOUISIANA RACING THOROUGHBREDS	LOWER LIMB SKELETAL DISEASE IN	077
LOWER LIMB SKELETAL DISEASE IN LOUISIANA RACING THOROUGHBREDS		077
LOWER RESPIRATORY TRACT	PARTITIONING OF AIRWAY RESISTANCE IN UPPER AND	098
LUTEINIZING HORMONE	OVULATION AND FERTILITY IN MARE UTILIZING SYNTHETIC	184
LUTEALYTIC PROCESS IN MARES		033
LUTEUM IN MAMMALS	CONTROL OF THE CORPUS	165
MAJOR GASTROINTESTINAL PARASITES	IDENTIFICATION AND CONTROL OF THE	027
MAMMALIAN RESPIRATORY DISEASES	PHYSIOPATHOLOGICAL STUDIES OF	162
MAMMALIAN SPERM PROTEINASES AND THEIR NATURAL INHIBITORS		041
MAMMALS	CONTROL OF THE CORPUS LUTEUM IN	165
MAMMALS	FACTORS AFFECTING EMBRYOGENESIS IN	042
MAMMALS	PATHOPHYSIOLOGICAL BASIS OF MUSCLE DISEASES BIRDS	013
MAMMALS	MECHANISM OF OVARIAN STEROID SYNTHESIS STORAGE AND RELEASE IN	039
MAMMALS-HORSES	COMPARATIVE BIOCHEMISTRY OF MILKS OF VARIOUS	101
MAMMARY SECRETIONS	SOLUBLE PROTEINS OF EQUINE BLOOD AND	071
MARE	IMPROVING EFFICIENCY OF REPRODUCTION IN THE	078
MARE IMMUNOPREGNANCY TEST FOR DETECTING EARLY EMBRYONIC MORTALITY		149

KEYWORD IN CONTEXT (continued)

MARE UTILIZING SYNTHETIC LUTEINIZING HORMONE	OVULATION AND FERTILITY IN	184
MARES	OVULATION CONTROL IN	095
MARES	LUTEOLYTIC PROCESS IN	033
MARES	CONTROL ESTRUS ONSET AND OVULATION IN	032
MARES	QUANTITATION OF HYPOPHYSEAL AND OVARIAN HORMONES IN	072
MARES	INFERTILITY-AN INVESTIGATION OF THE CAUSES OF ABORTION IN	182
MARES AND SOWS	INVESTIGATION OF FETAL MORTALITY IN COWS	167
MARKET ANALYSIS OF THE MARYLAND HORSE INDUSTRY		086
MARYLAND HORSE INDUSTRY	MARKET ANALYSIS OF THE	086
MARYLAND HORSE INDUSTRY	ANALYSIS OF COSTS AND RETURNS TO BREEDER-OWNER IN	085
MATERIALS CULTURES OF THE SOUTHWEST	INFLUENCES OF HORSES ON	026
MATERNAL BEHAVIOR	AN INVESTIGATION OF EQUINE DOMINANCE AND	121
MATURE HORSE SPERM CHROMOSOMES	STRUCTURE AND RELEASE MODE OF	135
MATURE HORSES	PROSPECTIVE VIROLOGIC STUDY OF EQUINE FETUSES FOALS AND	070
MEASUREMENT OF AIRWAYS RESISTANCE IN HORSES	NON-INVASIVE	132
MECHANICAL CONTROL OF BREATHING IN NEWBORN FOALS	PULMONARY MECHANICS AND	010
MECHANICAL MODELING OF LAMENESS	BIO	144
MECHANICAL MODELING OF LAMENESS IN RACEHORSES	BIO	025
MECHANICS AND MECHANICAL CONTROL OF BREATHING IN NEWBORN FOALS	PULMONARY	010
MECHANISMS	HEPATIC ORGANIC ANION TRANSPORT	028
MECHANISMS CONTROLLING SEQUENCE OF EVENTS AT OVULATION		040
MECHANISMS OF ADAPTATION IN CUTANEOUS BACTERIA	GENETIC	130
MECHANISMS OF PESTICIDE ACTION OF HORSE SERUM CHOLINESTERASE		131
MECLOFENAMIC ACID ON SYNOVIAL FLUID FROM ARTHRITIC MUSCLES	EFFECTS OF	089
MEDIATORS OF PULMONARY HYPERSENSITIVITY IN THE HORSE	VASOACTIVE	172
METABOLIC AND CONGENITAL BONE DISEASES OF ANIMALS		049
METABOLIC DISEASES OF ANIMALS	NUTRITIONAL AND	055
METABOLISM	EFFECTS OF LIGHT ON EQUINE	008
METABOLISM BINDING CAPACITY AND LIFESPAN IN THE NORMAL HORSE	ERYTHROCYTE	176
METAL SPECIES WITH BIOMOLECULES	INTERACTIONS OF TOXIC	044
MILKS OF VARIOUS MAMMALS-HORSES	COMPARATIVE BIOCHEMISTRY OF	101
MODE OF MATURE HORSE SPERM CHROMOSOMES	STRUCTURE AND RELEASE	135
MODELING OF LAMENESS	BIO-MECHANICAL	144
MODELING OF LAMENESS IN RACEHORSES	BIO-MECHANICAL	025
MODELS EQUINE	SLOW VIRUS INFECTION	152
MODIFIED HEMES	OXYGEN TRANSPORT OF HORSE HEMOGLOBINS WITH	124
MODIFIED HEMOGLOBINS OF THE HORSE	CONFORMATION STUDIES ON	127
MODIFIED LIVE RHINOPNEUMONITIS VIRUS VACCINE	STUDIES ON A COMMERCIAL	183
MOLEBY FOOD DISEASES	MYCOTOXINS AND	147
MORTALITY IN COWS MARES AND SOWS	INVESTIGATION OF FETAL	167
MORTALITY	MARE IMMUNOPREGNANCY TEST FOR DETECTING EARLY EMBRYONIC	149
MOSQUITOES	TRANSMISSION OF VIRUS DISEASES BY GNATS AND	021
MOUNTAIN	ADAPTATION BY ANIMALS IN DESERT AND	111

KEYWORD IN CONTEXT (continued)

MUSCLE DISEASES BIRDS MAMMALS	PATHOPHYSIOLOGICAL BASIS OF	013
MUSCLE SYSTEMS	PHARMACOLOGY OF NERVE	035
MUSCLES	EFFECTS OF MECLOFENAMIC ACID ON SYNOVIAL FLUID FROM ARTHRITIC	089
MUSCULO-SKELETAL ABNORMALITIES OF ANIMALS		155
MYCOTOXINS AND MOLDY FOOD DISEASES		147
MYCOTOXINS ON ANIMALS	EFFECTS OF	056
MYOGRAPHY IN INTROMISSION	COMPARISON OF PENIS PRESSURES AND	001
MYOPATHY	SELENIUM AND VITAMIN-E IN HORSES WITH NUTRITIONAL	187
MYXOVIRUS INFLUENZA A-EQUI ANTIGENIC VARIATIONS AND VIRUS RESERVOIRS IN BIRDS		074
NATURAL INHIBITORS	MAMMALIAN SPERM PROTEINASES AND THEIR	041
NECROSIS OF THE EQUINE THIRD AND CENTRAL TARSAL BONES	AVASCULAR	186
NEMATODE PARASITES	PASTURE SURVIVAL AND DEVELOPMENT OF	189
NERVE-MUSCLE SYSTEMS	PHARMACOLOGY OF	035
NEW ANTHELMINTICS FOR DOMESTICATED ANIMALS AND POULTRY	EVALUATE	083
NEWBORN FOALS	PULMONARY MECHANICS AND MECHANICAL CONTROL OF BREATHING IN	010
NITROGEN UTILIZATION IN THE EQUINE		145
NON-INVASIVE MEASUREMENT OF AIRWAYS RESISTANCE IN HORSES		132
NORMAL AND ABNORMAL PHYSIOLOGY IN DOMESTIC ANIMALS		036
NORMAL HORSE	ERYTHROCYTE METABOLISM BINDING CAPACITY AND LIFESPAN IN THE	176
NUTRIENT REQUIREMENTS AND INTERRELATIONSHIPS		045
NUTRIENT REQUIREMENTS FOR OPTIMUM GROWTH AND DEVELOPMENT OF THE YOUNG HORSE		030
NUTRIENT REQUIREMENTS OF THE LIGHT HORSE		120
NUTRITION AND PHYSIOLOGY OF THE HORSE		099
NUTRITIONAL AND BIOMEDICAL INTERACTIONS OF SELENIUM		138
NUTRITIONAL AND METABOLIC DISEASES OF ANIMALS		055
NUTRITIONAL AND PHYSIOLOGICAL RESPONSES IN HORSES		059
NUTRITIONAL FACTORS INFLUENCING EQUINE GROWTH AND PRODUCTIVITY		038
NUTRITIONAL MYOPATHY	SELENIUM AND VITAMIN-E IN HORSES WITH	187
OBSTRUCTIVE PULMONARY DISEASE IN HORSES	CHRONIC	075
ONSET AND OVULATION IN MARES	CONTROL ESTRUS	032
OPTIMUM GROWTH AND DEVELOPMENT OF THE YOUNG HORSE	NUTRIENT REQUIREMENTS FOR	030
ORAL FORMULATION AGAINST GASTROPHILUS SPP. IN PONIES	TRICHLORFON PASTE	002
ORGANIC ANION TRANSPORT MECHANISMS	HEPATIC	028
ORTHOPEDIC PATHOLOGY OF DOMESTIC ANIMALS		054
OSSIFICATION AND FUSION SITES	EQUINE	178
OTHER PARASITES IMPORTANT TO HEALTH OF HUMANS AND ANIMALS	HELMINTHS AND	087
OVARIAN HORMONES IN MARES	QUANTITATION OF HYPOPHYSEAL AND	072
OVARIAN STERIOD SYNTHESIS STORAGE AND RELEASE IN MAMMALS	MECHANISM OF	039
OVERO HORSES	LETHAL WHITE FOALS IN	015
OVULATION	MECHANISMS CONTROLLING SEQUENCE OF EVENTS AT	040
OVULATION AND FERTILITY IN MARE UTILIZING SYNTHETIC LUTEINIZING HORMONE		184
OVULATION CONTROL IN MARES		095
OVULATION IN ANIMALS	HORMONAL CONTROL OF	091

KEYWORD IN CONTEXT (continued)

OVULATION IN MARES	CONTROL ESTRUS ONSET AND	032
OWNER IN MARYLAND HORSE INDUSTRY	ANALYSIS OF COSTS AND RETURNS TO BREEDER	085
OXYGEN TRANSPORT OF HORSE HEMOGLOBINS WITH MODIFIED HEMES		124
PARASITES	PASTURE SURVIVAL AND DEVELOPMENT OF NEMATODE	189
PARASITES	BIOLOGICAL PROTECTION OF LIVESTOCK AGAINST INTERNAL	137
PARASITES	IDENTIFICATION AND CONTROL OF THE MAJOR GASTROINTESTINAL	027
PARASITES IMPORTANT TO HEALTH OF HUMANS AND ANIMALS	HELMINTHS AND OTHER	087
PARASITES IN DOMESTIC ANIMALS	DISTRIBUTION AND BIOLOGY OF	146
PARASITES OF DOMESTIC LIVESTOCK	HELMINTH	046
PARASITES OF HORSES	STRONGYLE	179
PARASITES OF HORSES DIAGNOSIS AND IMMUNIZATION STRONGYLUS VULGARIS	INTERNAL	076
PARASITES OF THE HORSE	CONTROLLING INTERNAL	068
PARASITISM IN DOMESTIC ANIMALS		004
PARTICLE DEPOSITION BRONCHIAL CLEARANCES	SULFATE AEROSOLS IN PULMONARY FUNCTION	113
PARTITIONING OF AIRWAY RESISTANCE IN UPPER AND LOWER RESPIRATORY TRACT		098
PASSAGE	VIRULENCE OF VENEZUELAN EQUINE ENCEPHALITIS VIRUS BY HOST	023
PASTE ORAL FORMULATION AGAINST GASTROPHILUS SPP. IN PONIES	TRICHLORFON	002
PASTURE SURVIVAL AND DEVELOPMENT OF NEMATODE PARASITES		189
PATHOGENESIS AND EPIZOOTIOLOGY OF ACUTE BACTERIAL HEPATITIS OF FOALS	ETIOLOGY	073
PATHOGENESIS AND IMMUNOGENESIS OF EQUINE ENCEPHALITIS VIRUSES		020
PATHOGENESIS OF DISEASE INDUCED BY EQUINE HERPESVIRUSES		067
PATHOGENESIS OF TANSY RAGWORT TOXICITY IN DOMESTIC ANIMALS		139
PATHOLOGY OF DOMESTIC ANIMALS	ORTHOPEDIC	054
PATHOLOGY OF SPONTANEOUS DISEASES OF THE HORSE		066
PATHOPHYSIOLOGICAL BASIS OF MUSCLE DISEASES BIRDS MAMMALS		013
PATHOPHYSIOLOGY OF CHRONIC DIARRHEA IN THE HORSE		143
PENIS PRESSURES AND MYOGRAPHY IN INTROMISSION	COMPARISON OF	001
PERINATAL LOSSES IN LIVESTOCK DUE TO GENETIC DISEASES	REDUCING	060
PESTICIDE ACTION OF HORSE SERUM CHOLINESTERASE	MECHANISMS OF	131
PHARMACOLOGIC CHARACTERIZATION OF ACUTE EQUINE LAMINITIS		108
PHARMACOLOGY OF NERVE-MUSCLE SYSTEMS		035
PHOSPHORUS UTILIZATION IN THE EQUINE	DIETARY FACTORS AFFECTING CALCIUM AND	063
PHYSICAL AND BIOLOGICAL CHARACTERISTICS OF FETAL IMMUNE GLOBULINS		043
PHYSICOCHEMICAL CHARACTERIZATION OF GENOME AND VIRION OF TOGAVIRUSES		019
PHYSIOLOGICAL RESPONSES IN HORSES	NUTRITIONAL AND	059
PHYSIOLOGY	EQUINE REPRODUCTIVE	164
PHYSIOLOGY IN DOMESTIC ANIMALS	NORMAL AND ABNORMAL	036
PHYSIOLOGY OF DIGESTION IN THE HORSE		031
PHYSIOLOGY OF THE HORSE	NUTRITION AND	099
PHYSIOPATHOLOGICAL STUDIES OF MAMMALIAN RESPIRATORY DISEASES		162
PIRCPLOSMOSIS	EQUINE	084
PITUITARY HORMONES	STUDIES ON ANTERIOR	037
PONIES	TRICHLORFON PASTE ORAL FORMULATION AGAINST GASTROPHILUS SPP. IN	002

KEYWORD IN CONTEXT (continued)

POTENCY AND TOXICOLOGY			
POTENTIAL OF DOMESTIC ANIMALS		ANAESTHETIC	017
POULTRY	EVALUATE NEW ANTHELMINTICS FOR DOMESTICATED ANIMALS AND	ENCEPHALITIS RESERVOIR	150
POULTRY BIOLOGY AND CONTROL OF ECTOPARASITES AND FLIES AFFECTING LIVESTOCK AND			083
PRELIMINARY INVESTIGATION OF CURRENT SURGICAL PROBLEMS			122
PRELIMINARY VETERINARY SCIENCE RESEARCH			061
PREPAREDNESS FOR LABORATORY ASSISTANCE IN DIAGNOSIS OF FOREIGN ANIMAL DISEASES			034
PRESSURES AND MYOGRAPHY IN INTRUSSION		COMPARISON OF PENIS	119
PRIMARY IMMUNOCDEFICIENCY DISEASES IN FOALS			001
PROBLEMS	PRELIMINARY INVESTIGATION OF CURRENT SURGICAL		102
PROCESS IN MARES		LUTEOLYTIC	061
PRODUCTION IN THE HAVASU RESOURCE AREA CALIF AND ARIZ	FERAL BURROS AND FORAGE		033
PRODUCTIVITY	NUTRITIONAL FACTORS INFLUENCING EQUINE GROWTH AND		005
PROFILES IN HORSES WITH EXPERIMENTALLY INDUCED ALIMENTARY LAMINITIS	COAGULATION		038
PROGRAM	EQUINE DRUG RESEARCH		103
PROPERTIES OF IMMUNOGLOBULINS OF DOMESTIC ANIMALS			123
PROSPECTIVE VIRCLOGIC STUDY OF EQUINE FETUSES FOALS AND MATURE HORSES			048
PROTECTION OF LIVESTOCK AGAINST INTERNAL PARASITES		BIOLOGICAL	070
PROTEIN BY EQUINE		UTILIZATION OF	137
PROTEIN REQUIREMENTS AND UTILIZATION IN THE EQUINE		FACTORS AFFECTING	140
PROTEINASES AND THEIR NATURAL INHIBITORS		MAMMALIAN SPERM	065
PROTEINS OF EQUINE BLOOD AND MAMMARY SECRETIONS		SOLUBLE	041
PSEUDOMONAS AERUGINOSA IN HORSES	HEMOLYSINS OF STAPHYLOCCI AND		071
PULMONARY DISEASE IN HORSES	CHRONIC OBSTRUCTIVE		069
PULMONARY FUNCTION PARTICLE DEPOSITION BRONCHIAL CLEARANCES	SULFATE AEROSOLS IN		075
PULMONARY HYPERSENSITIVITY IN THE HORSE	VASOACTIVE MEDIATORS OF		113
PULMONARY INSUFFICIENCY DURING ANESTHESIA IN HORSE			172
PULMONARY MECHANICS AND MECHANICAL CONTROL OF BREATHING IN NEWBORN FOALS			142
QUANTITATION OF HYPOPHYSEAL AND OVARIAN HORMONES IN MARES			010
QUARTER HORSES	INCREASING CONCEPTION RATE AND FOAL DEVELOPMENT IN		072
RACEHORSES	BIO-MECHANICAL MODELING OF LAMENESS IN		104
RACEHORSES	IDENTIFICATION OF DRUGS USED ILLICITLY IN		025
RACING THOROUGHBREDS	LOWER LIMB SKELETAL DISEASE IN LOUISIANA		081
RAGWORT TOXICITY IN DOMESTIC ANIMALS	PATHOGENESIS OF TANSY		077
RATE AND FOAL DEVELOPMENT IN QUARTER HORSES	INCREASING CONCEPTION		139
RATION ALTERNATIVES FOR HORSES			104
REDUCING PERINATAL LOSSES IN LIVESTOCK DUE TO GENETIC DISEASES			136
REGULATION OF GESTATION IN THE HORSE	ROLE OF THE FETUS IN HORMONAL		060
RELATED ARBOVIRUS DISEASES	EPIDEMIOLOGY OF VENEZUELAN EQUINE ENCEPHALITIS		190
RELATION IMMUNE COMPETENCE	RESPIRATORY DISEASE IN		153
RELATIONSHIP TO ETIOLOGY LAMINITIS	CIRCULATION OF THE FOREFOOT OF THE HORSE AND		006
RELEASE IN MAMMALS	MECHANISM OF OVARIAN STERIOD SYNTHESIS STORAGE AND		097
RELEASE MODE OF MATURE HORSE SPERM CHROMOSOMES	STRUCTURE AND		039
			135

KEYWORD IN CONTEXT (continued)

REPAIR IN HORSES	ENHANCEMENT OF ARTICULAR	115
REPRODUCTION	EQUINE	016
REPRODUCTION IN THE MARE	IMPROVING EFFICIENCY OF	078
REPRODUCTIVE PHYSIOLOGY	EQUINE	164
REQUIREMENTS AND INTERRELATIONSHIPS	NUTRIENT	045
REQUIREMENTS AND UTILIZATION IN THE EQUINE	FACTORS AFFECTING PROTEIN	065
REQUIREMENTS FOR OPTIMUM GROWTH AND DEVELOPMENT OF THE YOUNG HORSE	NUTRIENT	030
REQUIREMENTS OF THE LIGHT HORSE	NUTRIENT	120
RESEARCH	EQUINE	126
RESEARCH	DRUG EQUINE	105
RESEARCH	EQUINE EPISTAXIS	109
RESEARCH	PRELIMINARY VETERINARY SCIENCE	034
RESEARCH PROGRAM	EQUINE DRUG	123
RESERVOIR POTENTIAL OF DOMESTIC ANIMALS	ENCEPHALITIS	150
RESERVOIRS IN BIRDS MYXOVIRUS INFLUENZA A-EQUI ANTIGENIC VARIATIONS AND VIRUS		074
RESERVOIRS OF ARBOVIRUSES	WILDLIFE	166
RESISTANCE IN HORSES	NON-INVASIVE MEASUREMENT OF AIRWAYS	132
RESISTANCE IN UPPER AND LOWER RESPIRATORY TRACT	PARTITIONING OF AIRWAY	098
RESOURCE AREA CALIF AND ARIZ FERAL BURROS AND FORAGE PRODUCTION IN THE HAVASU		005
RESPIRATORY DISEASE IN RELATION IMMUNE COMPETENCE		006
RESPIRATORY DISEASES	EQUINE	118
RESPIRATORY DISEASES	PHYSIOPATHOLOGICAL STUDIES OF MAMMALIAN	162
RESPIRATORY DISEASES BRONCHIAL LAVAGE SAMPLING TECHNIQUES	CHRONIC	100
RESPIRATORY DISEASES IN HORSES	UPPER	003
RESPIRATORY DISEASES OF HORSES AT ONTARIO RACETRACKS		174
RESPIRATORY FUNCTION TESTING OF HORSES		193
RESPIRATORY TRACT	PARTITIONING OF AIRWAY RESISTANCE IN UPPER AND LOWER	098
RESPONSE OF THE HORSE	IMMUNE	052
RESPONSES IN HORSES	NUTRITIONAL AND PHYSIOLOGICAL	059
RETURNS TO BREEDER-OWNER IN MARYLAND HORSE INDUSTRY	ANALYSIS OF COSTS AND	085
RHINOPNEUMONITIS AND EQUINE VULVITIS-BALANITIS	STUDY ON THE VIRUSES OF EQUINE	173
RHINOPNEUMONITIS VIRUS VACCINE	STUDIES ON A COMMERCIAL MODIFIED LIVE	183
ROLE OF THE FETUS IN HORMONAL REGULATION OF GESTATION IN THE HORSE		190
SALMONELLOSIS TETRACYCLINE THERAPY AND SURGICAL STRESS IN THE HORSE		185
SAMPLING TECHNIQUES	CHRONIC RESPIRATORY DISEASES BRONCHIAL LAVAGE	100
SCIENCE RESEARCH	PRELIMINARY VETERINARY	034
SECRECTIONS	SOLUBLE PROTEINS OF EQUINE BLOOD AND MAMMARY	071
SELENIUM	NUTRITIONAL AND BIOMEDICAL INTERACTIONS OF	138
SELENIUM AND VITAMIN-E IN HORSES WITH NUTRITIONAL MYCOPATHY		187
SEQUENCE OF EVENTS AT OVULATION	MECHANISMS CONTROLLING	040
SERUM CHOLINESTERASE	MECHANISMS OF PESTICIDE ACTION OF HORSE	131
SERUM ELECTROLYTES	EXERCISE TRAINING AND	007
SERUM HEPATITIS	EQUINE	012

KEYWORD IN CONTEXT (continued)

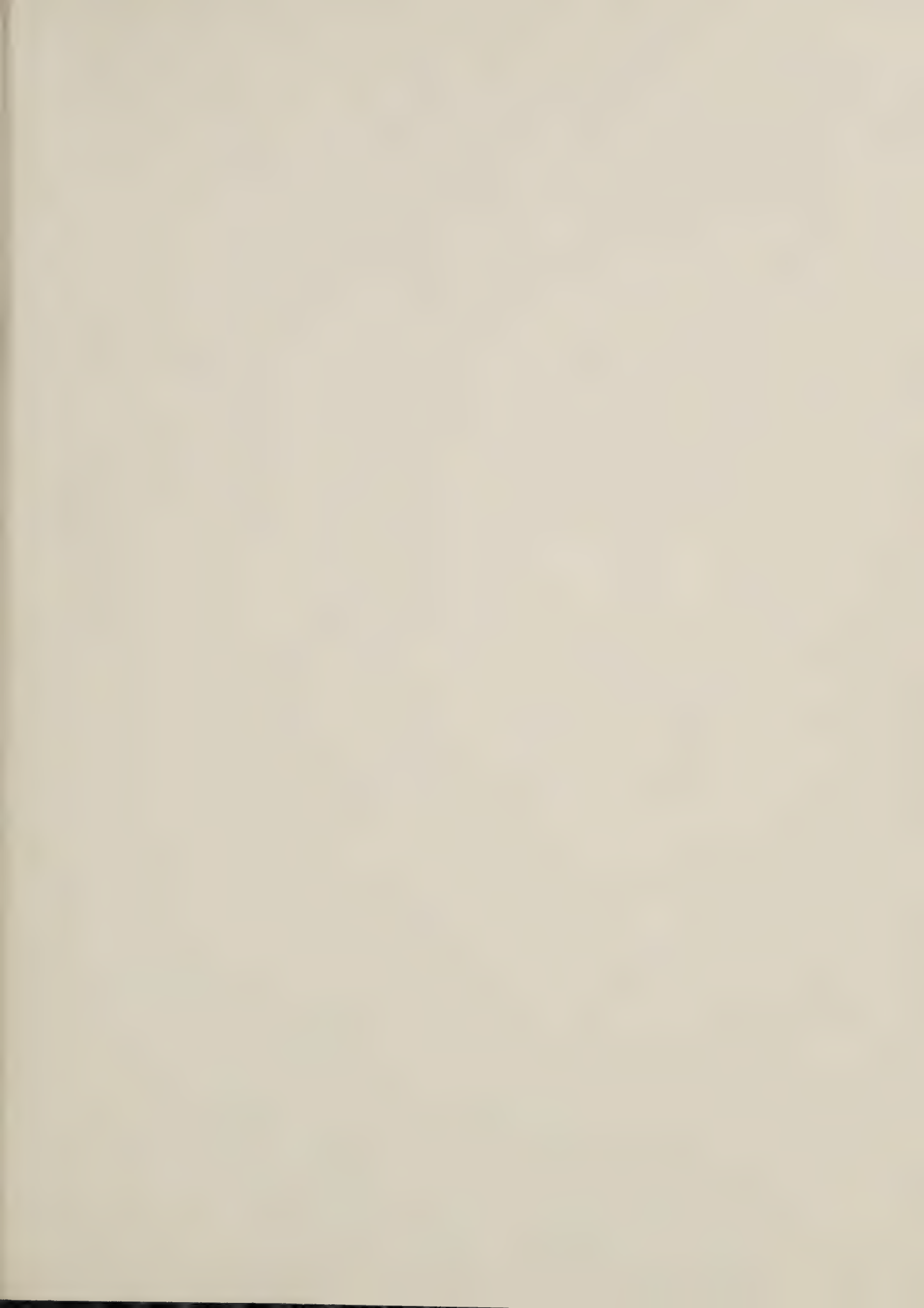
SHEAR STRESSES IN EQUINE CORONARY VESSELS	WALL	133
SHOCK	ENDOCRINE AND CARDIOVASCULAR DYNAMICS OF LAMINITIS AND	106
SITES	EQUINE OSSIFICATION AND FUSION	178
SKELETAL ABNORMALITIES OF ANIMALS	MUSCULO	155
SKELETAL DISEASE IN LOUISIANA RACING THOROUGHBREDS	LOWER LIMB	077
SLOW VIRUS INFECTION MODELS EQUINE		152
SOLUBLE PROTEINS OF EQUINE BLOOD AND MAMMARY SECRETIONS		071
SCMATIC CELL APPROACH IN GENETIC ANALYSIS OF EQUINES		128
SCUTSWEST	INFLUENCES OF HORSES ON MATERIALS CULTURES OF THE	026
SCWS	INVESTIGATION OF FETAL MORTALITY IN COWS MARES AND	167
SPECIES WITH BIOMOLECULES	INTERACTIONS OF TOXIC METAL	044
SPERM CHROMOSOMES	STRUCTURE AND RELEASE MODE OF MATURE HORSE	135
SPERM PROTEINASES AND THEIR NATURAL INHIBITORS	MAMMALIAN	041
SPINE USING BONE CEMENT	STABILIZATION OF THE EQUINE CERVICAL	188
SPONTANEOUS DISEASES OF THE HORSE	PATHOLOGY OF	066
SPP. IN PONIES	TRICHLORFEN PASTE ORAL FORMULATION AGAINST GASTROPHILUS	002
STABILIZATION OF THE EQUINE CERVICAL SPINE USING BONE CEMENT		188
STANDARDRED AND THOROUGHBRED HORSE	THYROID FUNCTION IN THE	177
STANDARDRED HORSE	ELECTROCARDIOGRAM OF THE	171
STAPHYLOCOCCI AND PSEUDOMONAS AERUGINOSA IN HORSES	HEMOLYSINS OF	069
STAPLE SUTURING TECHNIQUES FOR EQUINE ABDOMINAL SURGERY		094
STERIOD SYNTHESIS STORAGE AND RELEASE IN MAMMALS	MECHANISM OF OVARIAN	039
STORAGE AND RELEASE IN MAMMALS	MECHANISM OF OVARIAN STERIOD SYNTHESIS	039
STRESS IN THE HORSE	SALMONELLOSIS TETRACYCLINE THERAPY AND SURGICAL	185
STRESSES IN EQUINE CORONARY VESSELS	WALL SHEAR	133
STRONGYLE PARASITES OF HORSES		179
STRONGYLUS VULGARIS	INTERNAL PARASITES OF HORSES DIAGNOSIS AND IMMUNIZATION	076
STRONGYLUS VULGARIS INFECTION IN	ARTERIOGRAPHY IN	191
STRUCTURE AND FUNCTION MECHANISM AND CHEMICAL TRANSFORMATION	ENZYME	009
STRUCTURE AND RELEASE MODE OF MATURE HORSE SPERM CHROMOSOMES		135
SULFATE AEROSOLS IN PULMONARY FUNCTION PARTICLE DEPOSITION BRONCHIAL CLEARANCES		113
SURGERY	STAPLE SUTURING TECHNIQUES FOR EQUINE ABDOMINAL	094
SURGICAL PATIENT	INTRAVENOUS ALIMENTATION FOR THE EQUINE	093
SURGICAL PROBLEMS	PRELIMINARY INVESTIGATION OF CURRENT	061
SURGICAL STRESS IN THE HORSE	SALMONELLOSIS TETRACYCLINE THERAPY AND	185
SURVEILLANCE OF TROPICAL DISEASES INCLUDING EQUINE VIRAL ENCEPHALITIDES		082
SURVIVAL AND DEVELOPMENT OF NEMATODE PARASITES	PASTURE	189
SUTURING TECHNIQUES FOR EQUINE ABDOMINAL SURGERY	STAPLE	094
SWAMP FEVER IN EQUINE		057
SYNOVIAL FLUID FROM ARTHRITIC MUSCLES	EFFECTS OF MECLOFENAMIC ACID ON	089
SYNTHESIS STORAGE AND RELEASE IN MAMMALS	MECHANISM OF OVARIAN STERIOD	039
SYNTHETIC LUTEINIZING HORMONE	OVULATION AND FERTILITY IN MARE UTILIZING	184
SYSTEMS	PHARMACOLOGY OF NERVE-MUSCLE	035

KEYWORD IN CONTEXT (continued)

TANSY RAGWORT TOXICITY IN DOMESTIC ANIMALS	PATHOGENESIS OF	139
TARSAL BONES	AVASCULAR NECROSIS OF THE EQUINE THIPD AND CENTRAL	186
TAXONOMIC BIOLOGICAL AND DISTRIBUTIONAL STUDIES ON HORSE FLIES AND DEER FLIES		125
TECHNIQUES	CHRONIC RESPIRATORY DISEASES BRONCHIAL LAVAGE SAMPLING	100
TECHNIQUES FOR EQUINE ABDOMINAL SURGERY	STAPLE SUTURING	094
TESTING OF HORSES	RESPIRATORY FUNCTION	193
TETRACYCLINE THERAPY AND SURGICAL STRESS IN THE HORSE	SALMONELLOSIS	185
THEIR NATURAL INHIBITORS	MAMMALIAN SPERM PROTEINASES AND	041
THERAPEUTICS OF LARGE ANIMALS	DISEASES AND	148
THERAPY AND SURGICAL STRESS IN THE HORSE	SALMONELLOSIS TETRACYCLINE	185
THIAMIN ON HORSES	EFFECTS OF	175
THOROUGHBRED HORSE	THYROID FUNCTION IN THE STANDARDBRED AND	177
THOROUGHBREDS	LOWER LIMB SKELETAL DISEASE IN LOUISIANA RACING	077
THYROID FUNCTION IN THE STANDARDBRED AND THOROUGHBRED HORSE		177
TOGAVIRUSES	PHYSIOCHEMICAL CHARACTERIZATION OF GENOME AND VIRION OF	019
TOXIC METAL SPECIES WITH BIOMOLECULES	INTERACTIONS OF	044
TOXICITY IN DOMESTIC ANIMALS	PATHOGENESIS OF TANSY RAGWORT	139
TOXICITY IN HORSES	LEAD	092
TOXICOLOGY	ANAESTHETIC POTENCY AND	017
TOXINS INCLUDING COPPER AS CAUSES OF DISEASE IN ANIMALS	ENVIRONMENTAL	053
TRACT	PARTITIONING OF AIRWAY RESISTANCE IN UPPER AND LOWER RESPIRATORY	098
TRAINING AND SERUM ELECTROLYTES	EXERCISE	007
TRANSFORMATION	ENZYME STRUCTURE AND FUNCTION MECHANISM AND CHEMICAL	009
TRANSMISSION EPIDEMIOLOGY AND CONTROL	EQUINE INFECTIOUS ANEMIA DIAGNOSIS	079
TRANSMISSION OF INFECTIOUS DISEASES	ENDOPARASITE	158
TRANSMISSION OF VIRUS DISEASES BY GNATS AND MOSQUITOES		021
TRANSPORT MECHANISMS	HEPATIC ORGANIC ANION	028
TRANSPORT OF HORSE HEMOGLOBINS WITH MODIFIED HEMES	OXYGEN	124
TRICHLORFON PASTE ORAL FORMULATION AGAINST GASTROPHILUS SPP. IN PONIES		002
TROPICAL DISEASES INCLUDING EQUINE VIRAL ENCEPHALITIDES	SURVEILLANCE OF	082
TRYPANOSOMA EQUIPERDUM	STUDIES OF	170
TUMORS	ZOOGRAPHIC CHARACTERISTICS OF DOMESTIC ANIMALS WITH	088
UPPER AND LOWER RESPIRATORY TRACT	PARTITIONING OF AIRWAY RESISTANCE IN	098
UPPER RESPIRATORY DISEASES IN HORSES		003
USE OF CI-744 AS AN INDUCTIONAL AGENT FOR EQUINE ANESTHESIA		090
USED ILLICITLY IN RACEHORSES	IDENTIFICATION OF DRUGS	081
UTERO VACCINE VIRUS	EQUINE FETAL IMMUNOGLOBULINS FROM IN	022
UTILIZATION AND FEEDING BEHAVIOR IN THE EQUINE	FACTORS AFFECTING ENERGY	064
UTILIZATION IN THE EQUINE	NITROGEN	145
UTILIZATION IN THE EQUINE	FACTORS AFFECTING PROTEIN REQUIREMENTS AND	065
UTILIZATION IN THE EQUINE	DIETARY FACTORS AFFECTING CALCIUM AND PHOSPHORUS	063
UTILIZATION OF PROTEIN BY EQUINE		140
UTILIZING SYNTHETIC LUTEINIZING HORMONE	OVULATION AND FERTILITY IN MARE	184

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An Index of
**EQUINE
RESEARCH**

1975 U.S. DEPARTMENT
OF AGRICULTURE

SUPPLEMENT

SUPPLEMENT

An Index of Equine Research 1975

Compiled by

Edwin I. Pilchard, Principal Veterinarian

Cooperative State Research Service

UNITED STATES DEPARTMENT OF AGRICULTURE

April 1976

TABLE OF CONTENTS

	<u>Page</u>
Introduction	1
Description of Research Projects	2
Investigators	30
Performing Organizations	31
Granting Agencies	33
Errata	34

INTRODUCTION

Information in this Supplement includes a total of ninety-one (91) research project descriptions that were received subsequent to printer deadline for the Index of Equine Research, 1975 (CSRS, USDA, Washington, D. C. 1975). Each project is identified by an accession number. Accession numbers 194 through 284 are included in this Supplement. Numbers 001 through 193 are in the Index of Equine Research, 1975, dated December, 1975.

Errata that were noticed in the index are also reported in this Supplement. Pen and ink changes are arranged in order of the original page numbers in which they appeared. Deletions and substitutions of total projects are listed separately in the Errata.

The Keyword-in-Context cross-index (Index December 1975, pages 100-115) was not revised and therefore, is incomplete.

The Index of Equine Research cover page inadvertently omitted the words "compiled by". This has been corrected in the cover of the Supplement.

Future editions of the Index of Equine Research are anticipated, depending on user interest and the availability of funds. To assure that your project is included in a future edition, send descriptive information in the form shown together with fund and scientist-year information to: Dr. Edwin I. Pilchard, Cooperative State Research Service, USDA, Washington, D. C. 20250. Your suggestions and comments for improvement of the Index are welcome.

DESCRIPTION OF RESEARCH PROJECTS *

Connecticut

Wildlife Foci of Eastern Equine Encephalomyelitis (EEE) Virus

194

Investigator: S. W. Nielsen

Location: University of Connecticut

Start: July 1972

Storrs, Connecticut 06268

Terminate: June 1975

Objective:

To undertake an in-depth study of possible reservoir hosts for eastern equine encephalomyelitis (EEE) in wildlife in the Northeastern United States.

Approach:

A survey of pheasant flocks in Connecticut over the period of three years with bleeding during late summer or early fall will be taken to reveal areas of increased EEE virus activity. Next, an area in which the virus is active year after year will be located, and unconventional hosts and vectors will be investigated. Histopathologic studies of brain and selected internal organs will be carried out on several vertebrate species with positive serologic titers from the locales studied. Based on findings in the State of Connecticut, studies will be extended into other Northeastern States with EEE epidemics - New Jersey, Massachusetts and Delaware.

Illinois

Reserpine and Its Metabolites

195

Investigator: R. P. Link

Location: College of Veterinary Medicine

Start: May 1974

University of Illinois

Terminate: Indefinite

Urbana, Illinois 61801

Objective:

Identify and characterize reserpine and its metabolites in horses.

* Accession numbers 001 through 193 inclusive are in the Index of Equine Research, 1975 dated December 1975.

Investigator: G. H. Waring
State: January 1967
Terminate: May 1975

Location: Southern Illinois University
Carbondale, Illinois 62901

Objectives:

Determine the sequential and temporal characteristics of the behavioral development of American Saddlebred foals. Examine the characteristics and development of primary socialization to the dam as well as to man. Analyze the effects of supernormal early experience on the subsequent behavior of the horses.

Approach:

Quantitative and qualitative characteristics of the behavior patterns are gathered through direct observation, cinema and time-lapse photography, and video tape recording. Studies on each subject commence at parturition. Variations in social contact and handling-training occur. Data on all handling sessions are computer-stored for retrieval and analysis.

Equine Sounds and Communication

197

Investigator: G. H. Waring
State: November 1966
Terminate: May 1976

Location: Southern Illinois University
Carbondale, Illinois 62901

Objectives:

Determine the repertoire of American Saddlebred horses. Analyze and determine the physical characteristics of the sounds. Determine the biological function of the sounds through context analysis. Describe the visual cues normally associated with each sound emission. Evaluate and describe other expressive movements of horses and their use in communication.

Approach:

Sounds and expressive movements are recorded on audio and video tape recorders. Direct observation and cinema photography are also used to obtain and analyze data. Sounds are analyzed on sound spectrograph equipment. All sounds are analyzed on sound spectrograph equipment. All data are compared for qualitative and quantitative factors.

Energy Requirements of Horses for Work and Related Energy Value
of Different Feedstuffs

198

Investigator: J. P. Baker
Start: October 1974
Terminate: September 1977

Location: University of Kentucky
Lexington, Kentucky 40506

Objectives:

Determine the energy expenditure of horses traveling at different speeds over different distances. Determine the influence of physical conditioning of horses on the energy expenditure during work. Determine the net energy value for maintenance and the net energy for work of commonly-used horse feeds.

Approach:

Energy requirements of Quarter Horse geldings will be determined by collection of total feces and urine and measurement of respiratory gaseous exchange. Determinations will be made at rest and at various levels of work. The studies will be repeated with several commonly-used feeds for horses to determine the relative values of the feeds for meeting the horse's requirements for maintenance.

Abortigenic Disease Caused by Equine Herpesvirus I

199

Investigator: J. T. Bryans
Start: July 1971
Terminate: June 1976

Location: Department of Veterinary Science
College of Agriculture
University of Kentucky
Lexington, Kentucky 40506

Objective:

Obtain an improved method for control of abortigenic disease caused by equine herpesvirus I.

Approach:

Derivation of an improved system for prophylactic immunization of pregnant mares will include attempts to develop a stable, safe attenuated virus for possible use as a vaccine; a search for viruses that may provide heterotypic immunizing capability; investigation of chemical inactivation of viruses in respect to maintaining stable immunogenic potency; development of reproducible potency testing procedures for inactivated virus vaccine in small laboratory animals; performance of vaccination-challenge and serological tests to evaluate potency and safety of new vaccines for pregnant mares, weanlings, and yearling horses.

Investigator: R. G. Loy
Start: January 1976
Terminate: December 1979

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objectives:

Determine relationships among circulating levels of the sex hormones, estrogen, progesterone and gonadotrophin; ovarian activity; sexual behavior; and changes in the reproductive tract associated with return to normal nonpregnant state during the postpartum period. Correlate these parameters and relationships with levels of fertility at first estrus postpartum and at subsequent estrous periods. Examine effects on uterine involution and fertility during the postpartum interval of certain hormonal and pharmacological modifications of normal postpartum reproductive patterns.

Approach:

Post-parturient sexual behavior, reaction to teasing, will be correlated with the results of daily ovarian palpation. Vaginoscopic examination will be done with palpation and daily blood samples for hormonal analysis will be taken during the second postpartum estrus. Radioimmunoassay will be used to estimate estradiol-17 β , luteinizing hormone, and progesterone. The relationships in postpartum mares will be compared with normally cycling nonpregnant mares. Uterine involution and the hormonal relationships associated with return of foaling mares to normal cycling conditions will be recorded. Groups of mares kept under stud farm management conditions will be similarly observed. Effects of delaying estrus by steroid therapy fertility will be examined.

Resistance of Equine Strongyles to Anthelmintics Benzimidazoles and Other Compounds

Investigator: E. T. Lyons
Start: July 1974
Terminate: June 1977

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objective:

To determine the development of resistance of chemotherapeutic efficacy to Benzimidazoles and other selected chemical compounds of equine strongyles infecting horses.

Approach:

Field test anthelmintics for effectiveness in controlling strongyles in selected Thoroughbred and Standardbred horses in Central Kentucky. Perform critical tests including speciation of small strongyles on horses infected with benzimidazole-resistant parasites. Conduct field and critical tests designed to evaluate the effectiveness of new drug compounds against drug resistant parasites. Characterize the development of resistance to drugs of parasites in horses not previously exposed to such drugs.

Investigator: T. W. Swerczek Location: Department of Veterinary Science
Start: July 1974 University of Kentucky
Terminate: June 1977 Lexington, Kentucky 40506

Objective:

Study the pathologic and clinical pathologic changes in foals affected by a neuromuscular disease of foals of unknown etiology.

Approach:

Perform clinical, gross and histopathologic studies of foals with the shaker syndrome. Clinical pathologic studies of ante- and post-mortem specimens of blood, urine and tissues of affected foals and of the milk of mares with affected foals will be done to ascertain abnormalities of possible significance in the etiology of the disease.

Maryland

Equine Rhinopneumonitis (Equine Abortion Disease)

203

Investigator: S. K. Dutta Location: University of Maryland
Start: June 1971 College Park, Maryland 20742
Terminate: Indefinite

Objective:

To characterize equine rhinopneumonitis - equine abortion disease.

Approach:

The efficacy of a planned infection program for controlling equine abortion disease will be evaluated. Virus isolations and serum neutralization techniques will be used to identify immunologically different types of equine herpes virus (EHV) among field isolates. Nasal washings will be obtained from aborted mares and tested for the presence of immunoglobulin by virus neutralization and immunofluorescent techniques. Avirulent strains of EHV will be studied in vivo (hamsters) and in vitro (cell cultures) as possible immunizing agents. Temperature sensitive (TS) mutants will be plaque purified and evaluated as potential immunizing agents.

Equine Serum Transaminases as Related to Muscular Work and Protein Nutrition

204

Investigator: E. C. Leffel Location: University of Maryland
Start: July 1967 College Park, Maryland 20742
Terminate: Indefinite

Objectives:

Determine levels of serum transaminases in horses or ponies subjected to stress caused by exercising and conditioning. Determine effects of varying levels of dietary protein on serum transaminases and the adjustment to stress of exercise.

Horse Hoof Characteristics, their Control and Modification for Functional Durability

205

Investigator: E. C. Leffel
Start: July 1972
Terminate: June 1975

Location: University of Maryland
College Park, Maryland 20742

Objectives:

Characterize horse hoof abrasive resistance, resilience, shear strength, density, color, moisture content and possible interrelationships between these factors. Determine the effect of the periople in maintaining hoof health and functional durability. Test effects of hoof dressings on maintenance and function of the hoof. Reduce the cost of hoof care and improve horse hoof health.

Approach:

Initial work will be to determine characteristics, normal ranges, and variations in moisture levels, density, resistance to abrasion, resilience, shear strength, etc. The nature of the periople or outside surface of the hoof will be explored, regarding permeability to water, air, oils, etc, and at various depths from the periople and from the sole surface. Moisture readings will be obtained by inserting a hygrometer probe into previously drilled holes in the horse foot and reading electrical inductive resistance prevailing at various time intervals and at various locations. Similarly, moisture loss to the outside of the hoof will be measured. Environmental temperature and relative humidity will be considered. As techniques are tested and established, additional tests will be made such as effects of destroying the periople, applications of commercially popular hoof dressings, and experimental hoof dressings.

Studies of Parasite Control in the Equine Gastrointestinal Tract

206

Investigator: J. P. McCall
Start: July 1972
Terminate: June 1975

Location: University of Maryland
College Park, Maryland 20742

Objectives:

Investigate the efficiency of different methods of administration of anthelmintics. Develop a pattern of parasite control applicable in the central Maryland region.

Approach:

Ten light horses are to be observed under stabled conditions for transmission patterns of internal parasites. Five horses will receive the anthelmintic dosage by tube and five will receive the anthelmintic by feeding. The anthelmintics will be Thiobendazole, Piperazine and Carbon Disulfide.

Dosage Phenomena in Sex-Linked and Autosomal Variants

207

Investigator:	R. G. Davidson	Location:	Children's Hospital
Start:	August 1972		219 Bryant Street
Terminate:	Indefinite		Buffalo, New York 14222

Objectives and Approach:

Data bearing on the X-inactivation theory or Lyon hypothesis have been derived from diverse experimental systems, each yielding only partial proof. Our studies to obtain simultaneous biochemical and cytological data within a single experimental system have been partially completed and published (Proc. Nat. Acad. Sci. 68:544 1971). The studies will continue. These studies have utilized the female mule, a natural hybrid in which the paternal (donkey) and maternal (horse) X-chromosomes are morphologically distinct. Electrophoresis of X-linked glucose-6-phosphate dehydrogenase yielded a multiple band pattern in which each component was identifiable. In the cell cultures of the four animals studied, a majority of cells showed a late replicating donkey X-chromosome with a resulting ratio deviating significantly from that expected from random inactivation. Quantitation revealed a preponderance of horse type enzyme closely paralleling the cytological findings.

Ohio

Equine Sarcoid Tumor Antigens

208

Investigator:	C. L. Alden	Location:	College of Veterinary Medicine
Start:	October 1975		Ohio State University
Terminate:	December 1976		Columbus, Ohio 43210

Objective:

Immunologically demonstrate a common tumor-specific antigen and viral particles of the equine sarcoid.

Pathogenesis of Herpes II Infection in the Equine

209

Investigator:	J. R. Blakeslee	Location:	College of Veterinary Medicine
Start:	July 1974		Ohio State University
Terminate:	September 1976		Columbus, Ohio 43210

Objectives and Approach:

Determine the pathogenesis of equine Herpes II virus. Determine the incidence of this virus in naturally occurring disease. Determine if there are different antibody types associated with clinical and convalescent stages of this disease. Determine if a vaccine can be produced which will prevent the disease. Determine alterations in cellular immune mechanism in horses infected with the virus.

Measurement of Airways Resistance in Horses Using the Forced-Sinusoidal Oscillation Method

210

Investigator: R. Donnerberg
Start: April 1975
Terminate: March 1976

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

Introduce to equine medicine a reasonably non-invasive method for measuring pulmonary function and for detecting disease of small airways. Perform identical experiments using a well-fitting face mask. Twelve horses will be anesthetized and the trachea intubated with a cuffed endotracheal tube with Fleisch pneumo-trachygraph in series with an amplifier capable of varying amplitude and frequency. Compute by on-line analogue and digital devices pressure-flow measurements into and out of the trachea during rest, and after aerosolization with either isoproterenol or acetyl choline. Also compute lung impedance and its constituents: resistance, compliance, and inertiance.

Closure of Distal Radial Physes (Knees), Racing Performance, and Injuries in Two-Year-Old Standardbreds

211

Investigator: A. A. Gabel
Start: June 1974
Terminate: June 1976

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

Correlate radiographic evaluations of distal radial physes of two-year old Standardbred horses with their performance and with information obtained regarding racing or training injuries. Determine the relationship between skeletal maturity and radiographic image of the distal radial physes. The method used in this study is to radiograph the physes of two-year-olds in training every 45 days starting in May. A total of 113 two-year-olds are included in the project. The program has been voluntary.

Fractionation of Right Ventricular Output to the Lungs of the Horse

212

Investigator: R. L. Hamlin
Start: January 1975
Terminate: December 1976

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

Demonstrate the significance of body posture on distribution of blood flow to the lungs of the horse. A right atrial cardiac catheter will be placed, and carbonized microspheres tagged with either 141-Ce or 85 Sr will be injected while the horse is in various postures. Percentages of cardiac output perfusing each region of lung will be estimated by counting the percentage of total radioactivity recovered from each region.

Investigator: R. L. Hamlin Location: College of Veterinary Medicine
Start: January 1974 Ohio State University
Terminate: January 1976 Columbus, Ohio 43210

Objectives and Approach:

Quantify myocardial depressant factor in horse serum. Identify horses in various levels of reversibility of shock. A perfusion chamber will be employed that permits bathing cat papillary muscle in serum from normal horses and from horses with shock or preshock conditions. Contractility of the papillary muscle is measured with a strain gauge, and myocardial depressant factor contained within the horse serum may be quantitated.

Furosemide in Epistaxis of Horses

214

Investigator: R. L. Hamlin Location: College of Veterinary Medicine
Start: February 1975 Ohio State University
Terminate: July 1976 Columbus, Ohio 43210

Objectives and Approach:

Determine the possible effect of furosemide on the capacitance of pulmonary vasculature and on pulmonary pressures, as related to an explanation of the mechanism of treatment and prophylaxis of epistaxis (nosebleed) in horses.

Derivatizing Agent for Gas Chromatography

215

Investigator: R. Huffman Location: College of Veterinary Medicine
Start: July 1975 Ohio State University
Terminate: Indefinite Columbus, Ohio 43210

Objectives and Approach:

Characterize and evaluate an agent to form electron capturing derivatives of drugs containing alcoholic and phenolic groups in their structure. Utilize the agent to analyze equine specimens for the presence of such drugs.

Neuroectomies of Equine Limbs

216

Investigator: M.A. Hunter Location: College of Veterinary Medicine
Start: July 1974 Ohio State University
Terminate: July 1976 Columbus, Ohio 43210

Objectives and Approach:

Determine the sequelae of experimental neurectomy of equine limbs. One nerve on either a rear or front limb is being transected subsequent to studying the normal gait of an animal. The animal is then allowed to recover. Its gait is studied by making movies. Loss of sensory perception is studied by mapping areas on the limb where the animal can no longer detect pain, temperature change or proprioception stimuli. The operated animals are being held for a period of time in order to find how they compensate for the induced nerve injury and to determine if muscle atrophy of specific groups of muscles will occur.

Immunological Responses in the Equine Female Reproductive Tract

217

Investigator: K. V. Karaffa Location: College of Veterinary Medicine
Start: September 1974 Ohio State University
Terminate: September 1975 Columbus, Ohio 43210

Objectives and Approach:

Document and classify the various immunological responses of the equine female reproductive tract. Examine the possibility of an immune response causing infertility problems in mares.

Evaluation of Commercial Streptococcus Equi Vaccine

218

Investigator: E.S. McAllister Location: College of Veterinary Medicine
Start: November 1974 Ohio State University
Terminate: January 1976 Columbus, Ohio 43210

Objectives and Approach:

Characterize the efficacy of commercial streptococcus equi vaccine. Two Standardbred nurseries are cooperating in this study. Sixty foals from 1975 on these two farms have been divided into four groups with two groups receiving vaccine and two groups a placebo. They are currently being evaluated to see if disease develops in these foals or if reactions to the vaccine occur. Skin testing has been regularly performed and serum collected from these foals. We are now attempting to see if we can determine a way to evaluate the foals immune response to the vaccine.

Aerobic Capacity After Training and Effects of Drugs on Performance of Standardbred Horses

219

Investigator: D. W. Milne Location: College of Veterinary Medicine
Start: July 1974 Ohio State University
Terminate: December 1976 Columbus, Ohio 43210

Objectives and Approach:

Develop methods of measuring cardiovascular and chemical parameters in Standardbred horses before, during and after training. Determine changes in these parameters as the horses become physically fit and compare effects of training by the conventional compared to the interval method. Parameters studied include pulse prior, during and at ten minute intervals for one hour after submaximal workload. Venous lactate levels will be determined. Measure mixed venous and carotid PO_2 , PCO_2 , pH, and cardiac output by the thermal dilution method. Hemoglobin and serum total solids will be measured. Effects of low doses of promazine and amphetamine, furosemide and prednisolone sodium succinate on these parameters during submaximal performance will be studied using the blind-study technique.

Equine Cortical Bone Allografting

220

Investigator: D. W. Milne
Start: December 1975
Terminate: June 1977

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objective and Approach:

Determine the results of attempts to transplant large cortical bone grafts in the equine. Bone will be harvested from donor horses and deep frozen for at least 30 days. It will then be transplanted into six recipient horses. Should the method prove successful, frozen cortical bone allografts could be used as structural supports in many types of equine long bone fractures.

Pulmonary Arterial Wedge Pressures in the Resting Horse

221

Investigator: D. W. Milne
Start: 1975
Terminate: 1976

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

Determine right atrium (RA) and right ventricle (RV) blood pressures, blood gas tensions, and pH in the 454-kg resting adult horse, using a flow-directed intravenous catheter. Blood pressure recordings were made from right atrium, right ventricle, pulmonary trunk, and pulmonary arterial "wedge" positions in the standing, resting, adult horse. Similarly, comparisons were made of blood samples collected from these vascular positions, as well as from jugular vein and carotid artery. A consistently lower partial pressure of carbon dioxide and a greater partial pressure of oxygen and pH were found in blood samples from pulmonary arterial wedge than from carotid artery. Pulmonary arterial wedge blood gases, pH, and pressure data will be measured using a balloon-tipped flow-directed catheter in the nonsedated, nontranquilized, resting, adult horse.

Metabolism and Elimination of Procaine Penicillin in the Horse

222

Investigator: G. Monti
Start: June 1974
Terminate: June 1975

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives:

Determine the persistence of procaine reactions in urine of horses given procaine penicillin.

Approach:

Administer procaine penicillin to horses and subsequently test the urine to determine the occurrence of procaine, especially in horses in racing competition.

Effects of Furosemide on Pulmonary Blood Volume in the Horse

223

Investigator: W. M. Muir
Start: June 1975
Terminate: June 1976

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

Describe the mechanism by which furosemide, a commonly used diuretic drug, prevents epistaxis in race horses. Measure pressures and volumes within various subvolumes of the lung blood. Cardiac catheters will be placed within the left atrium and pulmonary trunk. Indocyanine green dye and 82-Br will be injected into the pulmonary trunk, and indicator-dilution curves for both indicators will be constructed with sampling from the left atrium. Pressures will be recorded from the pulmonary trunk and left atrium. From the indicator-dilution curves, cardiac output, central blood volume, and central interstitial fluid volumes will be measured before and immediately following furosemide.

Fluid Mechanic Problems in Arterial Disease

224

Investigator: R. M. Nerem
Start: October 1971
Terminate: March 1976

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

The development of the left coronary artery pressure pulse is being examined in a series of horse studies. A commercially available hot film anemometer and probes developed at Ohio State are being used to measure coronary artery velocities in the left epicardial vessels of the horse heart.

Cocaine Detection

225

Investigator: J. S. Noonan
Start: July 1975
Terminate: Indefinite

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

A new sensitive method for the detection of cocaine in horse urine and blood samples will be evaluated.

Tranquilizer Detection

226

Investigator: J. S. Noonan
Start: July 1975
Terminate: Indefinite

Location: College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

Objectives and Approach:

A new chemical test for the phenothiazine tranquilizers in horse urine and blood samples will be evaluated. The method will be compared to the standard method.

Effects of Drugs on Performance and Effects of Exercise on
Drug Detection

227

Investigator: J. S. Noonan Location: College of Veterinary Medicine
Start: July 1975 Ohio State University
Terminate: December 1976 Columbus, Ohio 43210

Objectives and Approach:

Determine the effects of drugs on racing performance and also show whether exercise will effect our ability to detect the presence of drugs administered to horses in training.

Cardiac Ventricular Input in the Horse

228

Investigator: S. F. Schaal Location: College of Veterinary Medicine
Start: October 1975 Ohio State University
Terminate: September 1976 Columbus, Ohio 43210

Objectives and Approach:

Record electrocardiograms from the surface of the atria and from the conduction pathways between the atria and the ventricles to obtain understanding of the origin and maintenance of this arrhythmia and how it may be terminated by drugs.

Perfusion of Equine Limbs During General Anesthesia

229

Investigator: R. T. Skarda Location: College of Veterinary Medicine
Start: December 1975 Ohio State University
Terminate: June 1976 Columbus, Ohio 43210

Objectives and Approach:

Determine the effects of padding, position and passive movement on blood flow and metabolism of the muscles during anasthesia in horses. Arterial and venous blood from the limbs will be analysed for blood gases, enzymes, etc. during general anesthesia and the results will be correlated with causes of postoperative myoglobinemia.

Prostaglandin F₂ Alpha and Progesterone in Mares

230

Investigator: W. R. Threlfall Location: College of Veterinary Medicine
Start: December 1975 Ohio State University
Terminate: November 1976 Columbus, Ohio 43210

Objectives and Approach:

Ascertain the influence of prostaglandin F₂ alpha on the progesterone blood levels of cycling mares. Characterize the concentrations of progesterone in peripheral blood after administering prostaglandin.

Stress Analysis of Equine Long Bones and Internal Fixation

231

Investigator: A. S. Turner Location: College of Veterinary Medicine
Start: Not provided Ohio State University
Terminate: November 1975 Columbus, Ohio 43210

Objectives and Approach:

Determine the stress distribution, including maximum tension and stress, and maximum compressive stress during static and dynamic loading in vivo of the mid-diaphysis of the equine third metacarpus, third metatarsus, radius and tibia. Find the characteristic strain pattern during the various phases of locomotion and correlate it with gait. Correlate strain patterns with fractures commonly seen in these bones.

Investigation of Certain Aspects of Nutrition in the Equine

232

Investigator: W. J. Tyznik Location: Department of Animal Science
Start: June 1974 Ohio State University
Terminate: July 1977 Columbus, Ohio 43210

Objectives:

Study the effect of ration on milk production and milk composition of mares. Study the content of fat, protein solids and lactose in mares milk as the lactation progresses. Study the effect of early weaning on growth and development of foals.

Approach:

Twelve mares, six of which to be fed only hay and six to be fed hay plus concentrate, will be milked daily. Each milking will be divided into 60 ml fractions to determine variations between first and last drawn milk. Each mare is to be milked hourly for a 48 hour period each month to determine any diurnal variation and to get a concept of peak of lactation. Foals will be given creep feed beginning seven days of age. Their ration will contain 21% protein. Mares and foals will be weighed weekly and the foals measured for growth in height and length.

Pennsylvania

Intermedullary Fixation of Equine Fractures

233

Investigator: J. T. Alexander Location: School of Veterinary Medicine
Start: 1976 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Medullary cavities of post mortem specimens of humerus and femur will be reamed and filled with a plastic. The size and shape of the plastic models will be used in designing a modified cloverleaf intermedullary nail for the fixation of equine fractures.

Arthroscopic Technique in Equine Joints

234

Investigator: J. T. Alexander Location: School of Veterinary Medicine
Start: 1976 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Develop the use of the arthroscope as a diagnostic and surgical instrument. A system of grading the joint pathology would be developed based upon visual and photographic examination, histology, biomechanical and immunological parameters.

Vertical Laminar Flow System of Ventilation in Equine Anesthesia

235

Investigator: J. T. Alexander Location: School of Veterinary Medicine
Start: 1976 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the efficacy of a vertical laminar system in preventing post operative infection. Correlate particle counts and bacterial colony counts at various flow rates.

Immobilization of Fractured Legs of Horses

236

Investigator: J. T. Alexander Location: School of Veterinary Medicine
Start: 1976 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Develop an easily applied rigid splint which will conform to the legs to produce complete immobilization.

Comparative Study of Biopsies of the Equine Pharynx

237

Investigator: C. Boles Location: School of Veterinary Medicine
Start: 1975 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the histological effect of electrocautery on lymphoid hyperplasia observed prior to surgery in horses with pharyngitis.

Equine Congenital Epiglottic Entrapment and Hypoplasia of the Epiglottis

238

Investigator: C. Boles
Start: 1974
Terminate: Indefinite

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Investigate the possibility that hypoplasia of the epiglottis is inherited. Determine the significance of hypoplasia of epiglottis to epiglottic entrapment.

Catecholamines and Equine Luteal Progesterone

239

Investigator: W. A. Condon
Start: June 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Determine the effect of catecholamines on progesterone production by the equine corpus luteum in vitro.

Absorption and Secretion by the Obstructed Bowel of the Horse

240

Investigator: W. J. Donawick
Start: October 1975
Terminate: Indefinite

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Determine the normal sequence of secretion and reabsorption of water and the major cations potassium and sodium in Thiry-Vella fistulous segments of ileum and jejunum of conscious and undisturbed horses. Experimentally obstruct the small bowel of the horse at the ileo-cecal opening and with the aid of radio-isotopes quantify the movements of water and electrolytes into and out of the obstructed bowel.

Immunologic Factors Relating to Xenogeneic Storage of the Heart

241

Investigator: W. J. Donawick
Start: 1969
Terminate: September 1976

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Study the feasibility of and the immunologic response to interspecies storage of the heart (xenobanking). Determine if xenobanking results in privileged survival of the heart on retransplantation. Study the role of polymorphonuclear leukocytes in rejection of skin xenografts.

Lactate in Acute Intestinal Obstruction of Horses

242

Investigator: W. J. Donawick Location: School of Veterinary Medicine
Start: 1973 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the value of blood lactate as a measure of the need for surgical correction of acute intestinal obstruction and as a means to forecast the survival of horses with an acute abdomen.

Staple Suturing in Large Animals

243

Investigator: W. J. Donawick Location: School of Veterinary Medicine
Start: 1976 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the value of surgical stapling equipment in large animals. Evaluation is being made of the staples in procedures involving intestinal resection and anastomosis, enterotomy esophageal resection, and anastomosis in the horse, cow, pig, and sheep.

Rehabilitation of the Horse with Chronic Laminitis

244

Investigator: L. H. Evans Location: School of Veterinary Medicine
Start: 1973 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Study the dynamics of rotation of the third phalanx and the concurrent pathological lesions. Investigate and develop more efficient measures to prevent or alleviate the effects of third phalanx rotation of corrective shoeing, foot care and surgical intervention.

Prevention of Painful Neuromas in the Horse Following Neurectomy

245

Investigator: L. H. Evans Location: School of Veterinary Medicine
Start: 1966 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Utilize experimental animals and clinical patients to evaluate various techniques intended to prevent neuromas such as destruction of axon fibers to prevent regrowth, or by nerve stump capping or by a combination of the two procedures.

Surgical Management of Colic in the Horse

246

Investigator: L. H. Evans Location: School of Veterinary Medicine
Start: 1970 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Characterize the pathophysiology which results from an intestinal obstruction. Evaluate a series of clinical signs and laboratory results which will help to determine when the colic patient should be treated surgically or medically. Analyze the pre-surgical, surgical, and post-surgical periods.

Homologous Tendon Transplant

247

Investigator: G. E. Fackelman Location: School of Veterinary Medicine
Start: April 1974 University of Pennsylvania
Terminate: April 1977 Philadelphia, Pennsylvania 19174

Objective:

A method for preservation of tendon is being sought. This line of investigation is to lead to the establishment of a "bank" of equine tendon for use in the treatment of bowed tendons by means of tendon transplantation.

Computer Graphics in the Analysis of Equine Fractures

248

Investigator: G. E. Fackelman Location: School of Veterinary Medicine
Start: March 1975 University of Pennsylvania
Terminate: September 1975 Philadelphia, Pennsylvania 19174

Objective:

Computer graphics will be employed to analyze the various forms of fractures that commonly occur in the horse. It is hoped that by correlating this information with a structural analysis of the bones involved, inferences may be drawn as to the etiologic agents concerned in producing the fractures. This information will lead to measures to prevent the occurrence of the fractures.

Studies on Leukemia in the Horse

249

Investigator: J. Ferrer Location: School of Veterinary Medicine
Start: 1972 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine if equine leukemia is induced by a virus. If this proves to be the case, characterize the virus and define virus-tumor and host-tumor relationships.

Prevention of Postoperative Peritoneal Adhesions in the Horse

250

Investigator: D. E. Freeman Location: School of Veterinary Medicine
Start: 1976 University of Pennsylvania
Terminate: 1977 Philadelphia, Pennsylvania 19174

Objective:

Design a model to study the formation of peritoneal adhesions and investigate selected preventive measures. Study the effects of serosal injury in the horse, mesothelial recovery, and the fibrolytic activity of the new mesothelium.

Atrial Fibrillation in the Horse

251

Investigator: G. F. Fregin Location: School of Veterinary Medicine
Start: 1972 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objectives:

Study the etiology, pathophysiology, and treatment of atrial fibrillation in large animals.

Approach:

Information to date has been accumulated on 67 horses with atrial fibrillation. Studies have included cardiac catheterization, electrocardiography, phonocardiography, and response to exercise. Numerous antiarrhythmic drugs, autonomic blocking agents, and electrical reversion are being evaluated.

Autonomic Effects on the Electrocardiogram of the Normal Horse

252

Investigator: G. F. Fregin Location: School of Veterinary Medicine
Start: 1972 University of Pennsylvania
Terminate: May 1973 Philadelphia, Pennsylvania 19174

Objective:

Interpret the so-called non-specific repolarization phase changes (i.e. ST segment and T wave) that occur naturally in horses when clinical evidence of cardiovascular disease is lacking. Information is being accumulated on drugs, axion response, excitement, and other related subjects. Horses are studied at rest and with exercise.

Progesterone Metabolism in the Mare

253

Investigator: V. K. Ganjam Location: School of Veterinary Medicine
Start: January 1972 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine biological half-life, metabolic clearance rate, production rate, and secretion rate of progesterone in the mare during various physiological states.

"Unknown Progestagens" Occurring in Late Gestation of the Mare

254

Investigator: V. K. Ganjam Location: School of Veterinary Medicine
Start: September 1973 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Isolate and characterize the "unknown progestagens" by means of GLC - Mass Spectrometry.

Androgen Metabolism in the Stallion and Cryptorchid Horse

255

Investigator: V. K. Ganjam Location: School of Veterinary Medicine
Start: April 1972 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the basal levels, diurnal rhythms and effect of season on peripheral 17B-Hydroxyandrogen levels. Correlate behavior with circulating androgen levels.

Prostaglandin F₂ Alpha in the Mare

256

Investigator: V. K. Ganjam Location: School of Veterinary Medicine
Start: September 1973 University of Pennsylvania
Terminate: June 1976 Philadelphia, Pennsylvania 19174

Objective:

Study the efficacy of PG F₂ alpha treatment on induction of estrus and ovulation in the mare.

Muscle Glycogen Response to Exercise and Diet in the Equine

257

Investigator: E. Hammel Location: School of Veterinary Medicine
Start: September 1968 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Study the effects of degree of fitness, type of exercise, exhaustion, and high carbohydrate diet on muscle glycogen levels. Attempt to determine the etiology of exertional myoglobinuria in the horse.

Follicular Atresia in the Mare

258

Investigator: R. M. Kenney Location: School of Veterinary Medicine
Start: October 1973 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine and correlate the histological and biochemical characteristics of atretic ovarian follicles in contrast to those from non-atretic follicles.

Equine Secretory Antibodies

259

Investigator: R. M. Kenney Location: School of Veterinary Medicine
Start: April 1975 University of Pennsylvania
Terminate: May 1976 Philadelphia, Pennsylvania 19174

Objective:

An antigenic stimulus is being used to probe the mechanism of secretory antibody induction in colostrum during pregnancy by oral, intramammary, and subcutaneous routes.

Immunocompetence of Equine Uterus

260

Investigator: R. M. Kenney Location: School of Veterinary Medicine
Start: May 1975 University of Pennsylvania
Terminate: May 1976 Philadelphia, Pennsylvania 19174

Objective:

Endometrial immunocompetence of the mare is being tested by inoculation with synthetic antigen.

Bacteriostatic Mechanisms of Equine Uterus

261

Investigator: R. M. Kenney Location: School of Veterinary Medicine
Start: March 1975 University of Pennsylvania
Terminate: December 1976 Philadelphia, Pennsylvania 19174

Objective:

Determine possible differences between the resistant and susceptible uterus of the mare with regard to infection, by comparing cellular, humoral, and non-specific immunity.

262

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

To study the effects of prolonged anesthesia and recumbency in horses during orthopedic surgery and recovery from anesthesia.

263

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Determine the normal central venous pressure in the standing conscious horse and in the anesthetized horse in lateral and dorsal recumbency.

264

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Develop methods for allowing horses to recover from surgery and anesthesia floating in a pool of water.

265

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Determine the cardiopulmonary and muscular effects of immersion of horses in water.

Xylazine and Morphine Restraint and Analgesia in the Horse

266

Investigator: L. Klein Location: School of Veterinary Medicine
Start: 1974 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the efficacy of a combination of xylazine and morphine in the production of restraint and analgesia in the horse.

Methylprednisolone in the Horse

267

Investigator: L. Klein Location: School of Veterinary Medicine
Start: 1974 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the effect of pharmacologic doses of a cortico-steroid on cardiopulmonary functions and various metabolic and biochemical parameters.

Production of Surgical Analgesia in the Horse by Acupuncture

268

Investigator: A. M. Klide Location: School of Veterinary Medicine
Start: 1974 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Produce surgical analgesia and map the anatomic extent of the analgesia produced by acupuncture at various points.

Antibiotic Concentrations in Horses

269

Investigator: C. W. Kohn Location: School of Veterinary Medicine
Start: 1974 University of Pennsylvania
Terminate: 1976 Philadelphia, Pennsylvania 19174

Objective:

Ascertain levels of different antibiotics in serum, synovial fluid, urine and peritoneal fluid at different time intervals following a single dose of the drug. Multiple dosing will be studied. Ascertain the minimum inhibitory concentrations for bacteria commonly isolated from horses.

Measurement of Dehydration in the Horse

270

Investigator: C. W. Kohn
Start: 1974
Terminate: 1976

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Measure packed cell volume, serum sodium, potassium, and chlorine concentrations, extracellular fluid (ECF) and plasma volumes (PV) in normal horses and in experimentally and clinically dehydrated subjects. Data will be analyzed to determine actual shifts and losses of ECF and PV. Determine the relationship between measured values in order to predict the amount of fluid deficit in horses.

Cancellous Bone Transplants in the Horse

271

Investigator: M. Leitch
Start: September 1975
Terminate: September 1976

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Investigate the rate of "take" of cancellous bone when grafted into a defect in equine bone. Biopsies shall be taken at specified intervals and the histologic appearance will be correlated with concomitant radiographic findings.

Chronic Diarrhea in the Horse

272

Investigator: A. M. Merritt
Start: September 1972
Terminate: June 1978

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Define the location and nature of intestinal malfunction in the horse which result in the chronic diarrhea syndrome.

Chronic Pharyngeal Lymphoid Hyperplasia in the Horse

273

Investigator: C. W. Raker
Start: 1974
Terminate: 1976

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Study the effects of the application of electrocautery to the pharyngeal mucous membranes to promote a regression of hyperplastic lymphoid tissue and to improve air passage and tolerance for work.

Defects of the Nostrils and Nasal Passages in the Horse

274

Investigator: C. W. Raker Location: School of Veterinary Medicine
Start: 1975 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Characterize the effects of several newly recognized defects of the nostrils and nasal passages which restrict air flow leading to decreased tolerance for work. Develop methods to alleviate or manage these lesions to restore normal ventilation.

Bone Growth, Remodeling and Repair in the Horse

275

Investigator: E. J. Roberts Location: School of Veterinary Medicine
Start: Not Provided University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Determine the local and systemic responses of bone mineral metabolism in relation to growth, weight bearing, limb immobilization, skeletal fracture, and changes in nutritional or endocrine status, using radiotracer kinetic techniques, scintigraphy, and photon densitometry.

Equine Biomechanics

276

Investigator: J. R. Rooney Location: School of Veterinary Medicine
Start: September 1975 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Study structure and function of the hoof and develop protocols for further exploration in equine biomechanics.

Equine Biomechanics

277

Investigator: J. R. Rooney Location: School of Veterinary Medicine
Start: 1972 University of Pennsylvania
Terminate: Indefinite Philadelphia, Pennsylvania 19174

Objective:

Development of kinesiological and dynamic model of the foreleg of the horse.

Equine Influenza

278

Investigator: D. W. Webert
Start: 1975
Terminate: 1977

Location: School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

Objective:

Develop an automated serological test for equine influenza and conduct seroepidemiological studies in Pennsylvania.

South Dakota

Procedures to Control Livestock Insects

279

Investigator: P. H. Kohler
Start: July 1974
Terminate: June 1979

Location: South Dakota State University
Brookings, South Dakota 57006

Objectives:

Study horn fly and louse control on beef cattle. Study horn, stable and face fly control on horses.

Approach:

Compare insect control with ronnel-mineral granules with block form in administration of the drug to beef cattle. Bi-weekly horn fly counts will be made with an untreated herd as a control. Treatments will begin about June 1 with a minimum of 25 head per treatment. Louse counts will be made the following January. A study of at least hour applications for horn, stable and face fly control on horses will be conducted. Application will primarily be as a wipe-on treatment. Studies will be made for efficacy on pastured horses and horses used in summer equitation classes.

Washington

Persistence of Equine Infectious Anemia Virus

280

Investigator: T. B. Crawford
Start: January 1975
Terminated: December 1977

Location: Department of Veterinary Pathology
Washington State University
Pullman, Washington 99163

Objectives:

Describe the biochemical and antigenic characteristics of equine infectious anemia (EIA) virus. Define its relationship to other members of the slow virus group and to the oncogenic RNA viruses. Evaluate the function of humoral and cellular immune system in infected animals. Relate the findings of these studies to mechanisms of viral persistence in EIA.

Approach:

Biochemically study the RNA genome of the virus. Attempt to demonstrate an RNA-dependent DNA polymerase in the virion, and analyze the polypeptide profile of the viral proteins. Compare antigens of EIA virus and RNA tumor viruses, as well as the 'slow' RNA viruses. Surface antigens and oncogenic potential of a persistently infected diploid cell line will be evaluated by lectin agglutinability, by immunologic techniques and by response in hamster cheek pouches. Immunologic evaluation of the cellular immune mechanism will be performed using tritiated thymidine uptake by sensitive cells in the presence of cell-culture produced viral antigen. Preparations of viral antigen-containing membranes from infected cells will be used to attempt to induce resistance to infection.

Equine Immunology and Infectious Diseases

281

Investigator:	T. C. McGuire	Location:	Department of Veterinary Pathology
Start:	July 1975		Washington State University
Terminate:	August 1976		Pullman, Washington 99163

Objectives:

To generate basic virologic and serilogic data on equine virus diseases and to develop basic knowledge and applied techniques on the equine immune response and its relation to infectious disease, by applying currently available virologic and immunologic evaluation procedures to clinical disease problems in the field, and to adapt new techniques developed in other species to the disease problems of the horse.

Equine Infectious Anemia (EIA)

282

Investigator:	T. C. McGuire	Location:	Department of Veterinary Pathology
Start:	July 1975		Washington State University
Terminate:	June 1976		Pullman, Washington 99163

Objectives:

Elucidate the basic characteristics of EIA virus. Define the host humoral and cellular response in EIA virus. Study the efficiency of disinfectants against EIA virus. Study possible insect vectors.

Canada

Gastrointestinal Parasites of Equine

283

Investigator: L.Ayalew Location: University of Montreal
Start: March 1974 Saint Hyacinth, Quebec
Terminate: November 1975 Canada J2S 7C6

Objective:

Characterize the occurrence of equine gastrointestinal parasites in the Montreal area, Province of Quebec, Canada.

Approach:

Study the feces and perform necropsies of 100 horses.

Effects of Training on Standardbred Horses

284

Investigator: F. Duquette Location: University of Montreal
Start: 1973 Saint Hyacinth, Quebec
Terminate: December 1975 Canada J2S 7C6

Objective:

Determine effects of training on the electrocardiographic QRS complex and on blood cell profile.

Approach:

Perform electrocardiographic and hemographic examinations on 21 Standardbred horses at two week intervals from the 18th to 24th month of age.

INVESTIGATORS

Alden, C. L. - 208	McAllister, E. S. - 218
Alexander, J. T. - 233, 235, 235, 236	McCall, J. P. - 206
Ayalew, L. - 283	McGuire, T. C. - 281, 282
Baker, J. P. - 198	Merritt, A. M. - 272
Blakeslee, J. R. - 209	Milne, D. W. - 219, 220, 221
Boles, C. - 237, 238	Monti, G. - 222
Bryans, J. T. - 199	Muir, W. M. - 223
Condon, W. A. - 239	Nerem, R. M. - 224
Crawford, T. B. - 280	Nielsen, S. W. - 194
Davidson, R. G. - 207	Noonan, J. S. - 225, 226, 227
Donawick, W. J. - 240, 241, 242, 243	Raker, C. W. - 273, 274
Donnerberg R. - 210	Roberts, E. J. - 275
Duquette, F. - 284	Rooney, J. R. - 276, 277
Dutta, S. K. - 203	Schaal, S. F. - 228
Evans, L. H. - 244, 245, 246	Skarda, R. T. - 229
Fackelman, G. E. - 247, 248	Swerczek, T. W. - 202
Ferrer, J. - 249	Thelfall, W. R. - 230
Freeman, D. E. - 250	Turner, A. S. - 231
Fregin, G. F. - 251, 252	Tyznik, W. J. - 232
Gabel, A. A. - 211	Waring, G. H. - 196, 197
Ganjam, V. K. - 253, 254, 255, 256	Webert, D. W. - 278
Hamlin, R. L. - 212, 213, 214	
Hammel, E. - 257	
Huffman, R. - 215	
Hunter, M. A. - 216	
Karaffa, K. V. - 217	
Kenney, R. M. - 258, 259, 260, 261	
Klein, L. - 262, 263, 264, 265, 266, 267	
Klide, A. M. - 268	
Kohler, P. H. - 279	
Kohn, C. W. - 269, 270	
Leitch, M. - 271	
Leffel, E. C. - 204, 205	
Link, A. P. - 195	
Loy, R. G. - 200	
Lyons, E. T. - 201	

PERFORMING ORGANIZATIONS

Project Accession Numbers

CONNECTICUT

Northeastern Research Center for Wildlife
Diseases

University of Connecticut
Storrs, Connecticut 06268

and

Yale University Arbovirus Research Unit
Department of Epidemiology and Public Health
New Haven, Connecticut 06268

194

ILLINOIS

Department of Animal Industry and Zoology
Southern Illinois University
Carbondale, Illinois 62901

196, 197

College of Veterinary Medicine
University of Illinois
Urbana, Illinois 61801

195

KENTUCKY

Department of Veterinary Science
College of Agriculture
University of Kentucky
Lexington, Kentucky 40506

198, 199, 200, 201, 202

MARYLAND

University of Maryland
College Park, Maryland 20742

203, 204, 205, 206

NEW YORK

Children's Hospital
219 Bryant Street
Buffalo, New York 14222

207

PERFORMING ORGANIZATIONS (continued)

Project Accession Numbers

OHIO

College of Veterinary Medicine
Ohio State University
Columbus, Ohio 43210

207 through 231

Department of Animal Science
Ohio State University
Columbus, Ohio 43210

232

PENNSYLVANIA

School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania 19174

233 through 278

SOUTH DAKOTA

Agricultural Experiment Station
South Dakota State University
Brookings, South Dakota 57006

279

WASHINGTON

Department of Veterinary Pathology
Washington State University
Pullman, Washington 99163

280, 281, 282

CANADA

Faculte De Medecine Veterinaire
University of Montreal
Saint Hyacinthe, Quebec
Canada J2S 7C6

283, 284

GRANTING AGENCIES

	Project Accession Numbers
Canada, Blue Bonnets, Quebec Horse Industry Advisory Committee	283, 284
Connecticut, University of, Research Foundation Storrs, Connecticut 06268	194
Illinois, Southern Illinois University Carbondale, Illinois 62901	196, 197
Kentucky State Agricultural Experiment Station University of Kentucky, Lexington, Kentucky 40506	198, 199, 200, 201, 202
Maryland State Agricultural Experiment Station University of Maryland, College Park, Maryland 20742	203, 204, 205, 206
Ohio College of Veterinary Medicine Ohio State University, Columbus, Ohio 43210	208 through 231
Ohio State Agricultural Experiment Station Ohio State University, Columbus Ohio 43210	232
Pennsylvania School of Veterinary Medicine University of Pennsylvania, Philadelphia, Penn. 19104	233 through 278
South Dakota State Agricultural Experiment Station South Dakota State University, Brookings, South Dakota 57006	279
Washington College of Veterinary Medicine Washington State University, Pullman, Washington 99163	280, 281, 282

Pen and Ink Changes

1. Page 4. Delete project 004.
2. Page 13, 14 and 15. Gainesville, Florida ZIP Code is 32611.
3. Page 18. Project 039. Correct title as follows:
Mechanism of Ovarian Steroid Synthesis, Storage and Release in Mammals
4. Page 20. Project 045. Delete title and insert:
Effect of Protein on Equine Growth and Development
5. Page 30. Project 066. Investigator is T. W. Swerczek.
6. Page 31. Project 068. Start date is January 1972.
7. Page 33. Project 072, Objectives. Delete the following sentence:
"Investigate the hormonal relationship between the ovary and the pituitary gland of the mare".
8. Page 33. Project 074. Termination date is June 1976.
9. Page 39. Project 085 and 086. Termination date for both of these projects is June 1975.
10. Page 47. Project 112. Delete description of approach and insert:
"Six geldings, 4-5 years of age, and of mixed breeding will be assigned at random to a control and a treated group. Vitamin E will be supplemental to a basic diet of oats and timothy hay for the treated group. During two phases of the experiment there will be two levels of vitamin E supplementation and two levels of exercising under standard conditions in the treated group. Parameters of response will be blood alpha-tocopherol, blood lactate, hemoglobin and packed cell volume, and recovery time of heart and respiratory rate after exercise".
11. Page 49. Project 117. Change dates to:
Start: July 1966
Terminate: Indefinite
12. Page 54. Delete project 132.
13. Page 55. Delete project 133.

ERRATA (continued)

14. Page 62. Delete Project 152.
15. Page 64. Delete Project 156.
16. Page 65. Delete Project 159.
17. Page 66. Project 160. Delete last sentence and insert:
"Attempt will be made to restore B-cell and T-cell function with fetal liver transplants and to restore T-cell function with fetal thymus transplants".
18. Page 82. Delete Brown, J. F. - 004
Delete Crowe, M. T. - 066
Delete Crawford, T. B. - 156
19. Page 83. Add Swerczek, T. W. - 066
Delete Moore, R. W. - 152
Delete McGuire, T. C. - 159
Add Nerem, R. M. - 133
Delete, Pimmel, R. L. - 132
Delete Smith, C. R. - 133
20. Page 90. Delete Ohio State University 132, 133
Columbus, Ohio 43210
21. Page 91. College of Veterinary Medicine Delete 152
Texas A & M University

Delete Department of Veterinary Science 156, 159
Washington State University
Pullman, Washington 99163

ERRATA (continued)

Delete and substitute projects as indicated.

Page 13. Delete Project 028 and insert:

Hepatic Organic Anion Transport Mechanisms

028

Investigator:	R. R. Gronwall	Location:	College of Veterinary Medicine
Start:	June 1975		University of Florida
Terminate:	April 1978		Gainesville, Florida 32611

Objective:

Study the mechanisms involved in transport of large organic anions from plasma to bile and interactions of compounds in that transport.

Approach:

Utilize horses, ponies and sheep with chronic biliary fistulas. Mutant South-down and Corriedale sheep with inherited hepatic anion transport defects and the effects of fasting will be included in the studies.

Page 29. Delete Project '064 and insert:

Factors Affecting Energy Utilization and Feeding
Behavior in the Equine

064

Investigator:	J. P. Baker	Location:	University of Kentucky
Start:	July 1973		Lexington, Kentucky 40506
Terminate:	June 1978		

Objectives:

Determine influence of dietary changes on production and absorption of volatile fatty acids in different segments of the equine intestinal tract. Determine influence of physical and chemical composition of diet on appetite and feeding behavior.

Approach:

Investigation will be made of the influence of varying levels of fiber and of sources of starch upon the products of digestion and fermentation in the gut, and the influence of dietary changes upon metabolites absorbed from the equine intestinal tract into the portal blood system by catheterization of the portal system and measurement of portal carotid differences. The influence of dietary changes upon appetite and feeding behavior will be measured. Records will be maintained of the intake and refusal of various types of diets, and observations of feeding behavior by means of time-lapse motion pictures.

Page 30. Delete Project 065 and insert:

Factors Affecting Protein Requirements and
Utilization in the Equine

065

Investigator: J. R. Baker
Start: July 1973
Terminate: June 1978

Location: University of Kentucky
Lexington, Kentucky 40506

Objectives:

Measure degradation of dietary protein in different segments of equine intestinal tract. Determine influence of dietary protein on utilization of other nutrients. Determine quantitative dietary protein requirement for growth and development of two to six months old horses.

Approach:

Pre- and post-cecal disappearance of dietary nitrogen will be measured using the chromic oxide ratio technique with fecal samples and with digesta samples drawn from permanent re-entrant cannulae connecting the terminal ileum with the cecum. Feeding trials will be conducted using cecal-fistulated animals with various sources and forms of proteins being both fed and cecally administered to determine their influence on cellulose digestion. Colts of uniform ancestry (Quarter Horse or Thoroughbred) will be weaned at two months of age and placed on diets containing protein levels of 16%, 19% and 22%. Measurements of weight gain, body growth, nitrogen balance and creatinine coefficients will be made. The trial will be terminated when the horses reach six months of age.

Page 31. Delete Project 067 and insert:

Virus and Host Factors in Disease Induced by Equine Herpesviruses

067

Investigator: R. W. Darlington
Start: August 1974
Terminate: June 1977

Location: Department of Veterinary Science
University of Kentucky
Lexington, Kentucky 40506

Objective:

Determine if a disease process can be induced in foals by equine herpesvirus 3, whether horse macrophages can support the replication of EHV-1, 2 and 3 and to establish the morphologic and biologic pattern of EHV-3 replication in equine cells.

Approach:

Foals free of humoral antibodies will be inoculated with EHV-3 and their clinical, virologic and immune responses measured. Gross and histopathologic responses to infection will be characterized. The ability of horse macrophages to support replication of the herpesviruses will be determined by in vitro attempts to cultivate the virus and assessment of its ability to replicate by virologic and electron microscopic techniques. The morphologic and biologic pattern of EHV-3 replication in cell cultures of equine origin will be described from virologic and electron microscopic studies of cultures of established cell lines infected by the virus.

ERRATA (continued)

Page 35. Delete Project 077 and insert:

Lower Limb Skeletal Disease in Louisiana Racing Thoroughbreds

077

Investigator: P. F. Haynes
Start: 1975
Terminate: 1977

Location: School of Veterinary Medicine
Louisiana State University
Baton Rouge, Louisiana 70803

Objectives:

Correlate the gross, microscopic and radiographic findings in racehorse forelimbs, with the respective case history. Record incidence of tendon, bone and joint disease distal to the carpus and reasons for euthanasia of horses injured while racing. Correlate information on post-mortem specimens with clinical and radiologic changes in experimental control animals. Determine effects of prior therapy on tendon, bone and joint disease.

Approach:

Examine specimens and related records from horses euthanatized due to acute injuries that occur during thoroughbred racing meets in Louisiana. Clinically and radiographically examine thoroughbred horses not apparently affected by musculo-skeletal disease. Evaluate and correlate the resultant findings.

Page 52. Delete Project 126 and insert:

Equine Nutrition Bone and Joint Diseases

126

Investigator: H. F. Schryver
Start: April 1966
Terminate: Indefinite

Location: College of Veterinary Medicine
Cornell University
Ithaca, New York 14850

Objectives:

Study factors related to bone and joint disease in horses, including the protein, calcium, phosphorus, magnesium, zinc, potassium, and vitamins A and D requirements for optimum bone growth and development. Factors also include forces of locomotion at specified sites in the digit.

Approach:

Study digestive and exercise physiology related to nutrition and bone development, sites and factors affecting nutrient absorption, mineral homeostasis, and diagnosis of nutritional diseases. Study body composition, nutrition and digestion in young and adult horses. An analytical digit model will be developed to use external kinematic, force and geometric data to determine internal forces.

ERRATA (continued)

Page 55. Delete Project 133 and insert:

Wall-Shear Forces in Coronary Vessels of Horses

133

Investigator: R. M. Nerem

Location: College of Veterinary Medicine

Start: October 1973

Ohio State University

Terminate: December 1975

Columbus, Ohio 43210

Objectives and Approach:

Measurements are being made of the propagation speed of the pressure pulse in the horse coronary arteries. A computer model of blood flow and pressure in the left coronary arteries of the horse is being developed. It is hoped that this model may be used to predict the general pressure and flow patterns in the horse heart under various cardiac anomalies, e.g. aortic insufficiency, patent ductus, or ventricular septal defects.

ERRATA (continued)

Pages 77 - 81. Delete all funds and scientist years (SY). Insert the following table. These figures include amounts for projects in the original An Index of Equine Research 1975 as well as the Supplement to this publication.

<u>Subject of Research</u>	<u>Total Funds</u>	<u>Total Scientist Years</u>	<u>Projects</u>
ANATOMY	\$ 2,690	---	1
BEHAVIOR	18,300	0.1	4
ECONOMICS	15,692	0.3	4
ENTOMOLOGY	94,569	0.9	5
EPIDEMIOLOGY	---	---	6
GENETICS	30,858	0.4	6
IMMUNOLOGY	341,000	3.9	30
INFECTIOUS DISEASES	1,479,535	14.3	54
NUTRITION	611,689	6.9	27
PARASITOLOGY	666,921	6.8	19
PATHOLOGY	578,768	6.3	60
PHARMACOLOGY	400,796	4.2	15
PHYSIOLOGY	483,465	6.0	58
RADIOLOGY	---	---	1
REPRODUCTION	454,466	5.2	30
SURGERY	37,362	0.6	19
TOXICOLOGY	188,381	1.5	8
TOTALS	\$5,404,492	57.4	284

Averages \$94,155 per SY; \$19,030 per project; 0.2 SY per project

